

CANTELMO 10/051199 Page 1

=> FILE REG
FILE 'REGISTRY' ENTERED AT 10:52:32 ON 05 JUN 2003
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STRUCTURE FILE UPDATES: 4 JUN 2003 HIGHEST RN 525536-93-0
DICTIONARY FILE UPDATES: 4 JUN 2003 HIGHEST RN 525536-93-0

TSCA INFORMATION NOW CURRENT THROUGH JANUARY 6, 2003

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Crossover limits have been increased. See HELP CROSSOVER for details.

Experimental and calculated property data are now available. See HELP
PROPERTIES for more information. See STNote 27, Searching Properties
in the CAS Registry File, for complete details:
<http://www.cas.org/ONLINE/STN/STNOTES/stnotes27.pdf>

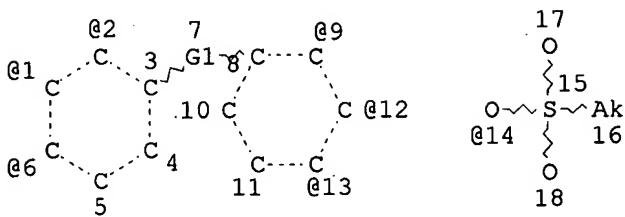
=> FILE HCAPLUS
FILE 'HCAPLUS' ENTERED AT 10:52:37 ON 05 JUN 2003
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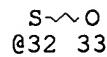
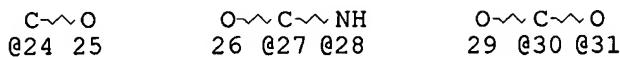
FILE COVERS 1907 - 5 Jun 2003 VOL 138 ISS 23
FILE LAST UPDATED: 4 Jun 2003 (20030604/ED)

This file contains CAS Registry Numbers for easy and accurate
substance identification.

=> D QUE
L3 STR



G2 @19 G3 @20 F~Ak~F
21 @22 23



VAR G1=24/22/27-3 28-8/30-3 31-8/32

VAR G2=BR/CL/I/14

VAR G3=I/BR/CL/14

VPA 19-9/12/13 U

VPA 20-1/2/6 U

NODE ATTRIBUTES:

CONNECT IS E1 RC AT 25

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 33

STEREO ATTRIBUTES: NONE

L6 SCR 2043

L8 2186 SEA FILE=REGISTRY SSS FUL L3 AND L6

L9 2516 SEA FILE=HCAPLUS ABB=ON L8

L10 4 SEA FILE=HCAPLUS ABB=ON L9(L) ELECTROLYTE? (L) MEMBRANE?

L11 29 SEA FILE=HCAPLUS ABB=ON L9 AND ELECTROLYTE? (L) MEMBRANE?

L12 1400 SEA FILE=HCAPLUS ABB=ON L9(L) (PREP OR IMF OR SPN)/RL

L13 18 SEA FILE=HCAPLUS ABB=ON L11 AND L12

L14 27 SEA FILE=HCAPLUS ABB=ON L12 AND FUEL(2A) CELL#

L15 25 SEA FILE=HCAPLUS ABB=ON L14 AND (ELECTROLYTE? OR MEMBRANE?)

L16 30 SEA FILE=HCAPLUS ABB=ON L10 OR L13 OR L15

=> D L16 1-30 ALL HITSTR

L16 ANSWER 1 OF 30 HCAPLUS COPYRIGHT 2003 ACS

AN 2003:319959 HCAPLUS

DN 138:339060

TI Crosslinkable aromatic resins having protonic acid groups, and ion conductive polymer membranes, binders, and fuel cells made by using the same

IN Ishikawa, Junichi; Kuroki, Takashi; Fujiyama, Satoko; Omi, Takehiko; Nakata, Tomoyuki; Okawa, Yuichi; Miyazaki, Kazuhisa; Fujii, Shigeharu; Tamai, Shoji

PA Mitsui Chemicals, inc., Japan

SO PCT Int. Appl., 132 pp.

CODEN: PIXXD2

DT Patent

LA Japanese

2,186 polymers
found with this monomer.
Query covers all possibilities
for monomer A

IC ICM C08G065-40
 ICS C08G069-48; C08G073-10; C08J005-22; H01M008-02
 CC 37-3 (Plastics Manufacture and Processing)
 Section cross-reference(s): 38, 52

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2003033566	A1	20030424	WO 2002-JP10536	20021010

W: CA, CN, IN, JP, KR, US
 RW: DE, FR, GB, IT, SE

PRAI JP 2001-312799 A 20011010
 JP 2002-182252 A 20020621

AB The invention relates to (A) a crosslinkable arom. resin which has crosslinking groups and protonic acid groups and is suitable for **electrolyte membranes** and binders for **fuel cells**, (B) polymeric **electrolyte membranes** and binders for **fuel cells**, made by using the resin, and (C) **fuel cells** made by using the **membranes** or the binders. The arom. resin has crosslinking groups which are not derived from protonic acid groups and are capable of causing crosslinking without the formation of a leaving component, and exhibits excellent ionic cond., heat resistance, water resistance, and adhesion, and low methanol permeability. It is preferable that the arom. resin bears as the crosslinking groups both Cl-10 alkyl bonded directly to an arom. ring and carbonyl or carbon-carbon double or triple bonds, while preferred examples of the crosslinkable arom. resin include arom. polyether, arom. polyamide, arom. polyimide, arom. polyamide-imide, and arom. polyazole, each of which has crosslinking groups described above. Thus, 5,5'-carbonylbis(sodium 2-fluorobenzenesulfonate) obtained from 0.525 mol 4,4'-difluorobenzophenone and 210 mL 50% sulfuric acid 4.22, 4,4'-difluorobenzophenone 2.18, and 2,2-bis(3,5-dimethyl-4-hydroxyphenyl)propane 5.69 g were reacted at 160.degree. for 4 h in the presence of potassium carbonate to give 10.39 g polyether ketone powder with reduced viscosity 0.85 dL/g, glass transition temp. 230.degree., and 5% wt. loss temp. 367.degree., which was applied on a glass and dried at 200.degree. for 4 h to give a **membrane** with cond. 0.018 S/cm at 30.degree. and 0.065 S/cm at 90.degree..

ST crosslinkable arom resin protonic acid group ion conductive **membrane**; carbonylbis(sodiumfluorobenzenesulfonate difluorobenzophenone bisdimethylhydroxyphenylpropane copolymer **membrane** prepn

IT Polyamides, uses
 Polyimides, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (arom., protonic acid-contg.; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

IT Polyimides, preparation
 RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (blend with protonic acid group-contg. polymer; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

IT Binders
 (ion conductive; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

IT **Membranes, nonbiological**
 (ionic conductive; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes, binders, and fuel cells**)

IT **Polyimides, uses**
 RL: TEM (Technical or engineered material use); USES (Uses)
 (polyamide-, arom., protonic acid-contg.; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes, binders, and fuel cells**)

IT **Polyimides, preparation**
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (polyamide-, crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes, binders, and fuel cells**)

IT **Polyketones**
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (polyamide-; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes, binders, and fuel cells**)

IT **Polyketones**
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (polyamide-polyimide-, crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes, binders, and fuel cells**)

IT **Polyimides, preparation**
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (polyamide-polyketone-, crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes, binders, and fuel cells**)

IT **Polyethers, preparation**
 RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (polybenzoxazole-, blend with protonic acid group-contg. polymer; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes, binders, and fuel cells**)

IT **Polyketones**
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (polybenzoxazole-, sodium sulfonated, crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes, binders, and fuel cells**)

IT **Polybenzoxazoles**
 RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (polyether-, blend with protonic acid group-contg. polymer; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes, binders, and fuel cells**)

IT **Polysulfones, preparation**
 Polysulfones, preparation

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyether-, crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

IT Polyketones
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyether-, optionally crosslinked, and blend with protonic acid group-contg. polymers; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

IT Polysulfides
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyether-, polyketones-; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

IT Polysulfones, preparation
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyether-; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

IT Polysulfones, preparation
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyether-polyketone-; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

IT Polyketones
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyether-polysulfone-; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

IT Polyamides, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(polyimide-, arom., protonic acid-contg.; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

IT Polyamides, preparation
Polyketones
Polysulfones, preparation
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyimide-, crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

IT Polysulfones, preparation
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyimide-polyketone-, blend with protonic acid group-contg. polymers; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

IT Polyamides, preparation
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyimide-polyketone-, crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer membranes, binders, and fuel cells)

IT Polyketones
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyimide-polysulfone-, blend with protonic acid group-contg. polymers; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer membranes, binders, and fuel cells)

IT Polyimides, preparation
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyketone-, crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer membranes, binders, and fuel cells)

IT Polyethers, preparation
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyketone-, optionally crosslinked, and blend with protonic acid group-contg. polymers; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer membranes, binders, and fuel cells)

IT Polybenzoxazoles
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyketone-, sodium sulfonated, crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer membranes, binders, and fuel cells)

IT Polyamides, preparation
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyketone-; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer membranes, binders, and fuel cells)

IT Polyimides, preparation
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyketone-polysulfone-, blend with protonic acid group-contg. polymers; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer membranes, binders, and fuel cells)

IT Polyethers, preparation
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyketone-polysulfone-; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer membranes, binders, and fuel cells)

IT Polyethers, preparation
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polysulfide-, polyketones-; prepn. of crosslinkable arom. resins

having protonic acid groups for ion conductive polymer
membranes, binders, and fuel cells)

IT Polyethers, preparation
Polyethers, preparation
Polyimides, preparation
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or
engineered material use); PREP (Preparation); USES (Uses)
(polysulfone-, crosslinked; prepn. of crosslinkable arom. resins having
protonic acid groups for ion conductive polymer **membranes,**
binders, and fuel cells)

IT Polyethers, preparation
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or
engineered material use); PREP (Preparation); USES (Uses)
(polysulfone-; prepn. of crosslinkable arom. resins having protonic
acid groups for ion conductive polymer **membranes, binders,**
and fuel cells)

IT **Fuel cells**
Ionic conductors
Polymer electrolytes
(prepn. of crosslinkable arom. resins having protonic acid groups for
ion conductive polymer **membranes, binders, and fuel**
cells)

IT Polymer blends
RL: PRP (Properties); TEM (Technical or engineered material use); USES
(Uses)
(prepn. of crosslinkable arom. resins having protonic acid groups for
ion conductive polymer **membranes, binders, and fuel**
cells)

IT Electrodes
(prepn. of crosslinkable arom. resins having protonic acid groups for
ion conductive polymer **membranes, binders, electrodes, and**
fuel cells)

IT Polyoxyarylenes
RL: TEM (Technical or engineered material use); USES (Uses)
(protonic acid-contg.; prepn. of crosslinkable arom. resins having
protonic acid groups for ion conductive polymer **membranes,**
binders, and fuel cells)

IT Polyoxyphenylenes
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or
engineered material use); PREP (Preparation); USES (Uses)
(sodium sulfonated; prepn. of crosslinkable arom. resins having
protonic acid groups for ion conductive polymer **membranes,**
binders, and fuel cells)

IT Polybenzoxazoles
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or
engineered material use); PREP (Preparation); USES (Uses)
(sulfonated; prepn. of crosslinkable arom. resins having protonic acid
groups for ion conductive polymer **membranes, binders, and**
fuel cells)

IT 25134-01-4DP, Poly(2,6-dimethyl-1,4-phenylene oxide), sodium sulfonated
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or
engineered material use); PREP (Preparation); USES (Uses)
(assumed monomers; prepn. of crosslinkable arom. resins having protonic
acid groups for ion conductive polymer **membranes, binders,**
and fuel cells)

IT 31694-16-3DP, PEEK 450P, sodium sulfonated
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP
(Properties); TEM (Technical or engineered material use); PREP

(Preparation); USES (Uses)
(blend with polyether-polyketone or polybenzoxazole, crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes, binders, and fuel cells**)

IT 515144-49-7P 515144-50-0P 515144-51-1P 515144-53-3P
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(blend with polyimide; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes, binders, and fuel cells**)

IT 29658-28-4P 32034-67-6P
RL: IMF (Industrial manufacture); PREP (Preparation)
(blend with protonic acid group contg. polymer; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes, binders, and fuel cells**)

IT 87781-17-7P 87792-34-5P
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(blend with protonic acid group contg. polymer; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes, binders, and fuel cells**)

IT 25897-65-8P, Bisphenol A-4,4'-difluorobenzophenone copolymer
28825-50-5P, 3,3',4,4'-Benzophenonetetracarboxylic dianhydride-3,3'-Diaminodiphenylsulfone copolymer 41205-96-3P 54571-77-6P
127583-87-3P 127669-56-1P 515144-54-4P 515144-55-5P
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(blend with protonic acid group-contg. polymer; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes, binders, and fuel cells**)

IT 515144-56-6P 515144-57-7P
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(blend with protonic acid group-contg. polymers; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes, binders, and fuel cells**)

IT 108-31-6DP, Maleic anhydride, reaction products with protonic acid group-contg. polymers 405-99-2DP, 4-Fluorostyrene, reaction products with sulfonated polymers 620-18-8DP, 3-Vinylphenol, reaction products with sulfonated polymers 1076-99-9DP, 4-Allylbenzoic acid, reaction products with protonic acid group-contg. polymers 1120-71-4DP, Propanesultone, reaction products with arom. polyether-polyketones 1745-89-7DP, reaction products with sulfonated polymers 20161-52-8DP, reaction products with sulfonated polymers 102501-86-0DP, 2-Allylphenol-2,6-dimethylphenol copolymer, sodium sulfonated 146673-88-3DP, reaction products with ethylenically unsatd. compds. 163395-54-8DP, reaction products with protonic acid group-contg. polymers 210531-46-7DP, reaction products with ethenylphenol 342047-78-3DP, reaction products with ethenylphenol 342047-79-4DP, reaction products with ethenylphenol 515144-35-1P 515144-36-2P
515144-37-3P 515144-38-4P 515144-39-5P 515144-40-8P 515144-41-9P
515144-42-0P 515144-44-2DP, sulfonated 515144-45-3DP, sulfonated

515144-47-5P 515144-48-6P 515144-51-1DP, reaction products with ethenylbenzoyl chloride 515144-53-3DP, reaction products with ethenylbenzoyl chloride 515144-58-8P 515144-59-9P
515144-66-8DP, reaction products with ethenylphenol
515144-67-9DP, reaction products with ethenylphenol
515144-68-0DP, reaction products with ethenylphenol
515144-69-1DP, reaction products with ethenylphenol
515144-70-4DP, reaction products with ethylenically unsatd. compds. 515144-71-5DP, reaction products with monoanhydride compds.
515144-72-6DP, reaction products with maleic anhydride 515144-73-7DP, reaction products with allylbenzoic acid, sulfonated 515144-74-8DP, reaction products with allylbenzoic acid, sulfonated 515144-75-9DP, reaction products with ethylenically unsatd. compds.
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer membranes, binders, and fuel cells)
IT 51698-33-0P 210531-45-6P 515144-46-4P
RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)
(monomer; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer membranes, binders, and fuel cells)
IT 515144-24-8P 515144-34-0P
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(optionally crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer membranes, binders, and fuel cells)
IT 515144-43-1DP, sulfonated
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polybenzoxazole, crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer membranes, binders, and fuel cells)
IT 24938-67-8DP, Poly(2,6-dimethyl-1,4-phenylene oxide), sodium sulfonated 267877-35-0DP, reaction products with ethenylphenol 515144-25-9P
515144-26-0P 515144-27-1P 515144-28-2P 515144-29-3P 515144-30-6P
515144-31-7P 515144-32-8P 515144-33-9P
515144-60-2P 515144-61-3P 515144-62-4P 515144-64-6DP,
sulfonated 515144-65-7DP, sulfonated 515811-98-0P
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer membranes, binders, and fuel cells)
IT 80-05-7, 2,2-Bis(4-hydroxyphenyl)propane, reactions 80-07-9,
4,4'-Dichlorodiphenylsulfone 345-92-6, 4,4'-Difluorobenzophenone
RL: RCT (Reactant); RACT (Reactant or reagent)
(reactant in monomer prepn.; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer membranes, binders, and fuel cells)
RE.CNT 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE

- (1) Commissariat A L'Energie Atomique; WO 0125312 A 2001 HCAPLUS
- (2) Commissariat A L'Energie Atomique; JP 2000510511 A 2001
- (3) Commissariat A L'Energie Atomique; US 200120082 A 2001
- (4) Commissariat A L'Energie Atomique; FR 2799198 A 2001 HCAPLUS
- (5) Hoechst Ag; JP 11-502245 A 1999
- (6) Hoechst Ag; WO 9629359 A 1999 HCAPLUS
- (7) Kaneka Corp; JP 2002105199 A 2002 HCAPLUS
- (8) Kaneka Corp; JP 2002121281 A 2002 HCAPLUS
- (9) Sumitomo Electric Industries Ltd; JP 2002358978 A 2002 HCAPLUS
- (10) Sumitomo Electric Industries Ltd; JP 2002367627 A 2002 HCAPLUS
- (11) Victrex Manufacturing Ltd; WO 0015691 A 2000 HCAPLUS
- (12) Victrex Manufacturing Ltd; JP 2002524631 A 2000

IT 29658-28-4P

RL: IMF (Industrial manufacture); PREP (Preparation)

(blend with protonic acid group contg. polymer; prepn. of crosslinkable
arom. resins having protonic acid groups for ion conductive polymer
membranes, binders, and fuel cells)

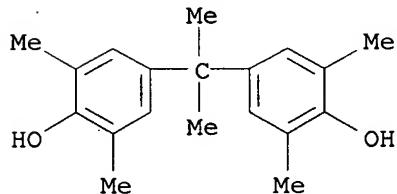
RN 29658-28-4 HCAPLUS

CN Phenol, 4,4'-(1-methylethyldene)bis[2,6-dimethyl-, polymer with
1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

CM 1

CRN 5613-46-7

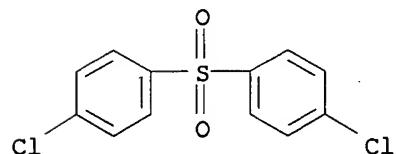
CMF C19 H24 O2



CM 2

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



IT 146673-88-3DP, reaction products with ethylenically unsatd.
compds. 515144-35-1P 515144-66-8DP, reaction products
with ethenylphenol 515144-67-9DP, reaction products with
ethenylphenol 515144-68-0DP, reaction products with
ethenylphenol 515144-69-1DP, reaction products with
ethenylphenol 515144-70-4DP, reaction products with
ethylenically unsatd. compds.

RL: IMF (Industrial manufacture); PRP (Properties); TEM
(Technical or engineered material use); PREP (Preparation); USES
(Uses)

(crosslinked; prepn. of crosslinkable arom. resins having protonic acid
groups for ion conductive polymer membranes, binders, and
fuel cells)

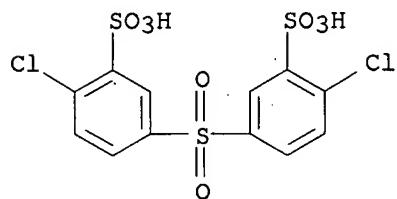
RN 146673-88-3 HCAPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer
with 4,4'-(1-methylethylidene)bis[phenol] and 1,1'-sulfonylbis[4-
chlorobenzene] (9CI) (CA INDEX NAME)

CM 1

CRN 51698-33-0

CMF C12 H8 Cl2 O8 S3 . 2 Na

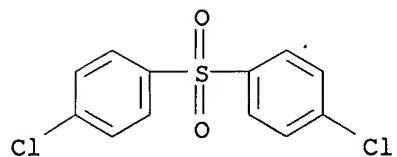


●2 Na

CM 2

CRN 80-07-9

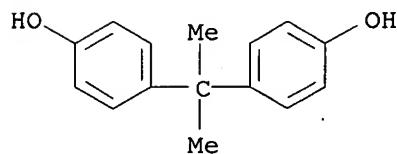
CMF C12 H8 Cl2 O2 S



CM 3

CRN 80-05-7

CMF C15 H16 O2



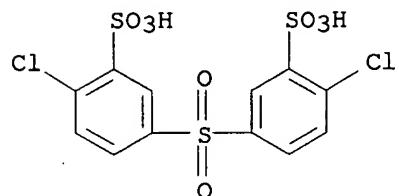
RN 515144-35-1 HCAPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with bis(4-chlorophenyl)methanone and 4,4'-methylenebis[2,6-dimethylphenol] (9CI) (CA INDEX NAME)

CM 1

CRN 51698-33-0

CMF C12 H8 Cl2 O8 S3 . 2 Na

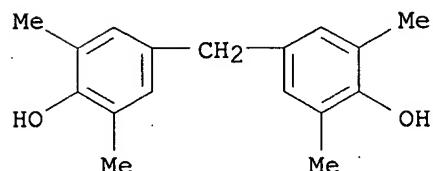


●2 Na

CM 2

CRN 5384-21-4

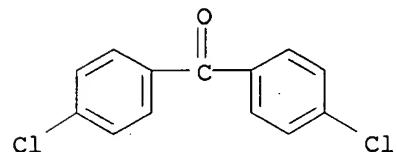
CMF C17 H20 O2



CM 3

CRN 90-98-2

CMF C13 H8 Cl2 O



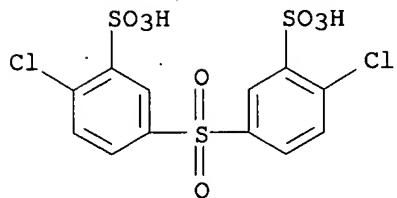
RN 515144-66-8 HCAPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol] (9CI)

(CA INDEX NAME)

CM 1

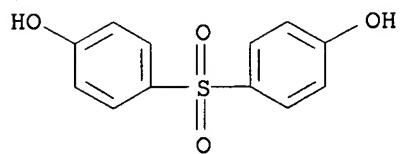
CRN 51698-33-0
CMF C12 H8 C12 O8 S3 . 2 Na



●2 Na

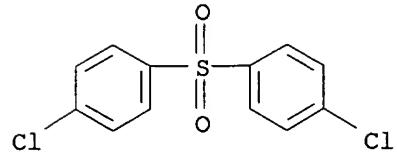
CM 2

CRN 80-09-1
CMF C12 H10 O4 S



CM 3

CRN 80-07-9
CMF C12 H8 C12 O2 S

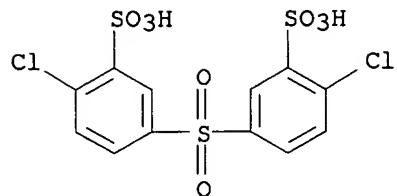


RN 515144-67-9 HCAPLUS
CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with 1,4-benzenediol and 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

CM 1

CRN 51698-33-0

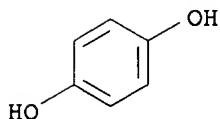
CMF C12 H8 Cl2 O8 S3 . 2 Na



●2 Na

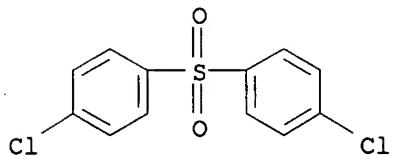
CM 2

CRN 123-31-9
CMF C6 H6 O2



CM 3

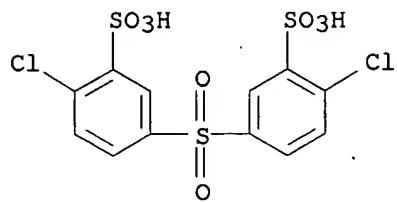
CRN 80-07-9
CMF C12 H8 Cl2 O2 S



RN 515144-68-0 HCAPLUS
CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with methylenebis[phenol] and 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

CM 1

CRN 51698-33-0
CMF C12 H8 Cl2 O8 S3 . 2 Na



●2 Na

CM 2

CRN 1333-16-0
CMF C13 H12 O2
CCI IDS

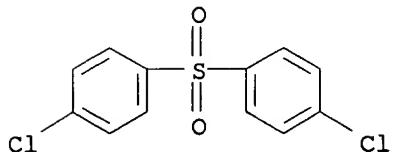


D1-OH

1/2 [D1-CH₂-D1]

CM 3

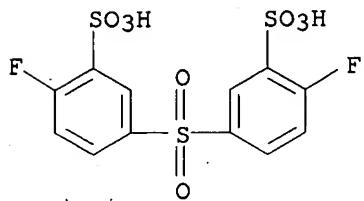
CRN 80-07-9
CMF C12 H8 Cl2 O2 S



RN 515144-69-1 HCAPLUS
CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-fluoro-, disodium salt, polymer with 4,4'-(1-methylethylidene)bis[phenol] and 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

CM 1

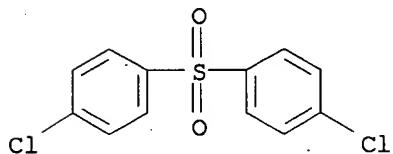
CRN 301155-59-9
CMF C12 H8 F2 O8 S3 . 2 Na



●2 Na

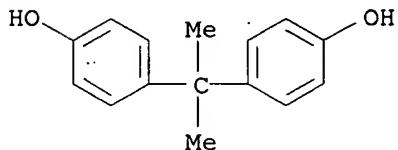
CM 2

CRN 80-07-9
CMF C12 H8 Cl2 O2 S



CM 3

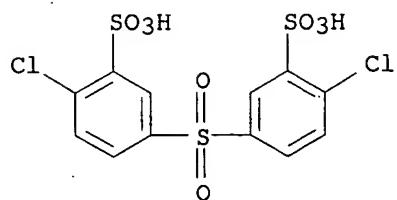
CRN 80-05-7
CMF C15 H16 O2



RN 515144-70-4 HCAPLUS
CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with 4,4'-(1-methylethylidene)bis[phenol] and 1,1'-sulfonylbis[4-fluorobenzene] (9CI) (CA INDEX NAME)

CM 1

CRN 51698-33-0
CMF C12 H8 Cl2 O8 S3 . 2 Na

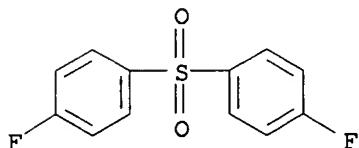


●2 Na

CM 2

CRN 383-29-9

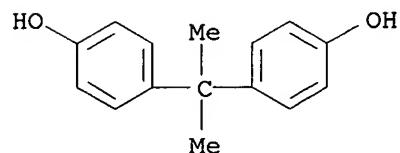
CMF C12 H8 F2 O2 S



CM 3

CRN 80-05-7

CMF C15 H16 O2



IT 515144-34-0P

RL: IMF (Industrial manufacture); PRP (Properties); TEM
(Technical or engineered material use); PREP (Preparation); USES
(Uses)

(optionally crosslinked; prepn. of crosslinkable arom. resins having
prot tonic acid groups for ion conductive polymer membranes,
binders, and fuel cells)

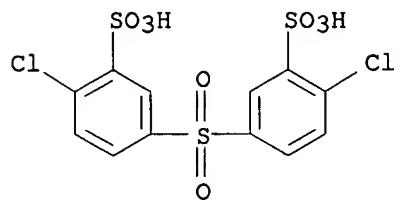
RN 515144-34-0 HCPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer
with bis(4-fluorophenyl)methanone and 4,4'-(1-methylethylidene)bis[2,6-
dimethylphenol] (9CI) (CA INDEX NAME)

CM 1

CRN 51698-33-0

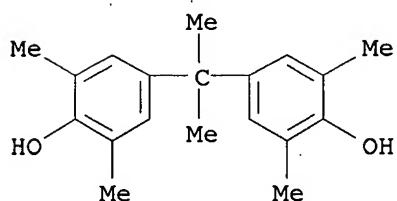
CMF C12 H8 C12 O8 S3 . 2 Na



●2 Na

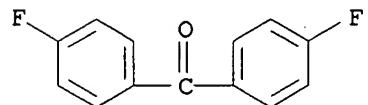
CM 2

CRN 5613-46-7
CMF C19 H24 O2



CM 3

CRN 345-92-6
CMF C13 H8 F2 O



IT 267877-35-0DP, reaction products with ethenylphenol
515144-32-8P 515144-33-9P 515144-60-2P

RL: IMF (Industrial manufacture); PRP (Properties); TEM
(Technical or engineered material use); PREP (Preparation); USES
(Uses)

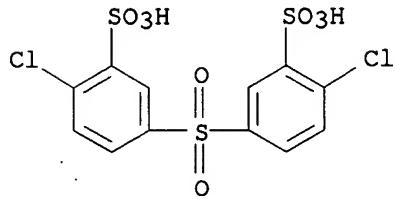
· (prepn. of crosslinkable arom. resins having protonic acid groups for
ion conductive polymer membranes, binders, and fuel
cells)

RN 267877-35-0 HCAPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer
with [1,1'-biphenyl]-4,4'-diol and 1,1'-sulfonylbis[4-chlorobenzene] (9CI)
(CA INDEX NAME)

CM 1

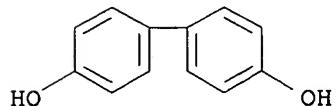
CRN 51698-33-0
CMF C12 H8 C12 O8 S3 . 2 Na



●2 Na

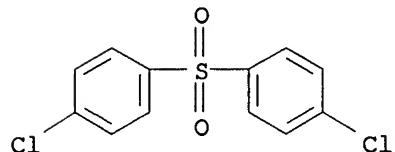
CM 2

CRN 92-88-6
CMF C12 H10 O2



CM 3

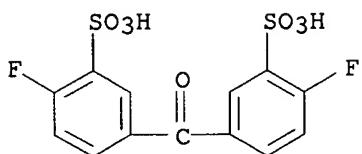
CRN 80-07-9
CMF C12 H8 C12 O2 S



RN 515144-32-8 HCAPLUS
CN Benzenesulfonic acid, 3,3'-carbonylbis[6-fluoro-, disodium salt, polymer with bis(4-chlorophenyl)methanone and 4,4'-(1-methylethylidene)bis[2,6-dimethylphenol] (9CI) (CA INDEX NAME)

CM 1

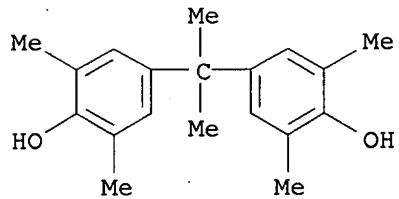
CRN 210531-45-6
CMF C13 H8 F2 O7 S2 . 2 Na



●2 Na

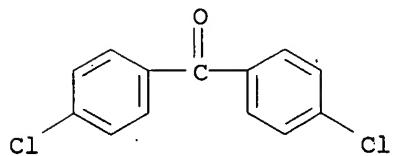
CM 2

CRN 5613-46-7
CMF C19 H24 O2



CM 3

CRN 90-98-2
CMF C13 H8 Cl2 O

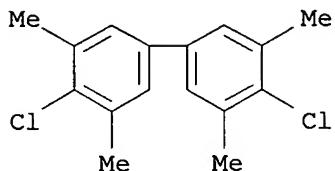


RN 515144-33-9 HCAPLUS

CN Benzenesulfonic acid, 3,3'-carbonylbis[6-chloro-, disodium salt, polymer with bis(4-chlorophenyl)methanone and 4,4'-dichloro-3,3',5,5'-tetramethyl-1,1'-biphenyl (9CI) (CA INDEX NAME)

CM 1

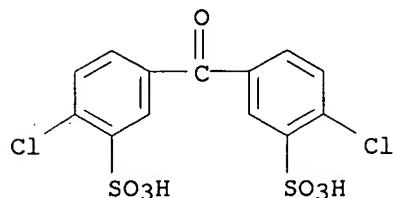
CRN 89448-05-5
CMF C16 H16 Cl2



CM 2

CRN 57004-46-3

CMF C13 H8 Cl2 O7 S2 . 2 Na

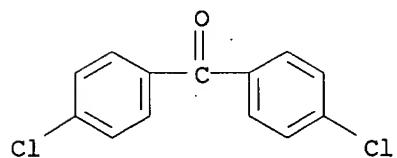


●2 Na

CM 3

CRN 90-98-2

CMF C13 H8 Cl2 O



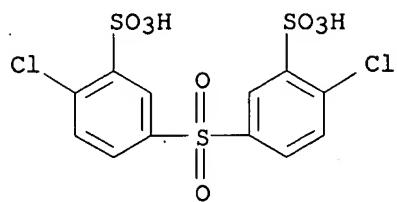
RN 515144-60-2 HCAPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with 4,4'-(1-methylethylidene)bis[2,6-dimethylphenol] (9CI) (CA INDEX NAME)

CM 1

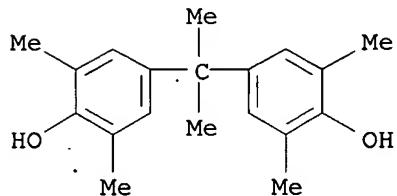
CRN 51698-33-0

CMF C12 H8 Cl2 O8 S3 . 2 Na



●2 Na

CM 2

CRN 5613-46-7
CMF C19 H24 O2

L16 ANSWER 2 OF 30 HCAPLUS COPYRIGHT 2003 ACS
 AN 2003:299029 HCAPLUS
 DN 138:305286
 TI Manufacture of branched polyarylene polymers with high toughness, their sulfonated products, and proton-conducting membranes
 IN Takahashi, Masayuki; Yamakawa, Yoshitaka; Futami, Satoshi; Goto, Kohei
 PA JSR Ltd., Japan
 SO Jpn. Kokai Tokkyo Koho, 21 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM C08G061-12
 ICS C08J005-18; H01B001-06; H01M008-02; H01M006-18; H01M010-40;
 C08L065-00
 CC 38-3 (Plastics Fabrication and Uses)
 Section cross-reference(s): 52
 FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 2003113226	A2	20030418	JP 2001-307430	20011003
PRAI JP 2001-307430		20011003		
AB	The branched polyarylene polymers are manufd. by copolymn. of (A) monomers contg. XC6R4AC6R4X (X = Cl, Br, I; A = electron-withdrawing group; R = H, F, alkyl, fluoroalkyl), XC6R4AC6R4OC6R4AC6R4X, and/or X(C6R4AC6R4B)nC6R4AC6R4X (B = electron-donating group, divalent group; n > 0, req. 2) and (B) monomers contg. X2C6R3A(C6R4B)mZ (Z = aryl; m = 0, 1, 2), X-p-C6R4X, X-p-C6R4-p-C6R4X, and/or 1,3-X-disubstituted C6R4 in the			

presence of (C) branching agents contg. C₆R'5AC₆R'5 (R' = H, Cl, Br, I, F, alkyl, fluoroalkyl, .gtoreq.3 of R' = Cl, Br, I), C₆R'5AC₆R'4OC₆R'4AC₆R'5, R'(C₆R'4AC₆R'4B)nC₆R'4AC₆R'5, C₆R'6, and/or C₆R'5C₆R'5. The proton-conducting **membranes**, useful for battery **electrolytes**, etc., are prep'd. by sulfonation of the branched polyarylene polymers with sulfonating agents. Thus, polymn. of 2,5-dichloro-4-phenoxybenzophenone 178, 2,4,4'-trichlorobenzophenone 2.0, 4,4'-dichlorobenzophenone 16, and 4-chlorobenzophenone 4.0 mmol gave a copolymer with Mw 146,000, which was sulfonated, dissolved in 1:1 vol NMP and methanol, cast, and dried to give a film with no tackiness and good surface smoothness.

ST branch polyarylene polyether polyketone proton conducting membrane; chlorophenoxybenzophenone chlorobenzophenone polymer sulfonation battery electrode

IT **Battery electrolytes**
(manuf. of sulfonated branched polyarylene polymers with high toughness for proton-conducting **membranes**)

IT **Polyketones**
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyether-, fluorine-contg.; manuf. of sulfonated branched polyarylene polymers with high toughness for proton-conducting membranes)

IT **Polyketones**
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyether-; manuf. of sulfonated branched polyarylene polymers with high toughness for proton-conducting membranes)

IT **Fluoropolymers, uses**
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyether-polyketone-; manuf. of sulfonated branched polyarylene polymers with high toughness for proton-conducting membranes)

IT **Polyethers, uses**
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyketone-, fluorine-contg.; manuf. of sulfonated branched polyarylene polymers with high toughness for proton-conducting membranes)

IT **Polyethers, uses**
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyketone-; manuf. of sulfonated branched polyarylene polymers with high toughness for proton-conducting membranes)

IT **Ionic conductors**
(protonic; manuf. of sulfonated branched polyarylene polymers with high toughness for proton-conducting membranes)

IT 69266-28-0P 122325-09-1P, 4,4'-Dichlorobenzophenone-hexafluorobisphenol A copolymer
RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)
(manuf. of sulfonated branched polyarylene polymers with high toughness for proton-conducting membranes)

IT 134-85-0DP, 4-Chlorobenzophenone, reaction products with polyarylene-polyether-polyketones, sulfonated 509075-82-5DP, reaction products with chlorobenzophenone, sulfonated 509075-83-6DP, reaction products with chlorobenzophenone, sulfonated 509075-84-7DP, reaction products with chlorobenzophenone, sulfonated

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(manuf. of sulfonated branched polyarylene polymers with high toughness for proton-conducting membranes)

IT 122325-09-1P, 4,4'-Dichlorobenzophenone-hexafluorobisphenol A copolymer

RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)
(manuf. of sulfonated branched polyarylene polymers with high toughness for proton-conducting membranes)

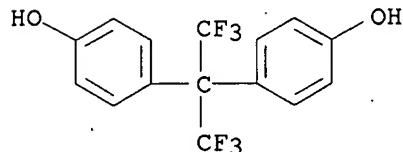
RN 122325-09-1 HCPLUS

CN Methanone, bis(4-chlorophenyl)-, polymer with 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[phenol] (9CI) (CA INDEX NAME)

CM 1

CRN 1478-61-1

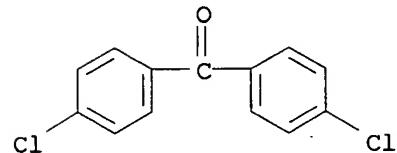
CMF C15 H10 F6 O2



CM 2

CRN 90-98-2

CMF C13 H8 Cl2 O



IT 509075-82-5DP, reaction products with chlorobenzophenone, sulfonated 509075-83-6DP, reaction products with chlorobenzophenone, sulfonated 509075-84-7DP, reaction products with chlorobenzophenone, sulfonated

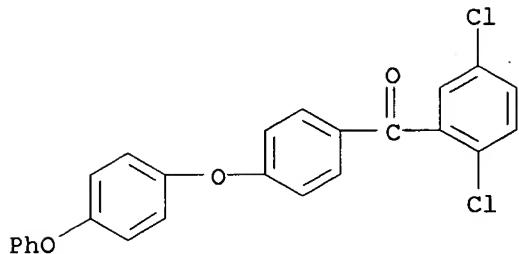
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(manuf. of sulfonated branched polyarylene polymers with high toughness for proton-conducting membranes)

RN 509075-82-5 HCPLUS

CN Methanone, bis(4-chlorophenyl)-, polymer with (4-chlorophenyl)(2,4-dichlorophenyl)methanone, (2,5-dichlorophenyl)[4-(4-phenoxyphenoxy)phenyl]methanone and 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[phenol] (9CI) (CA INDEX NAME)

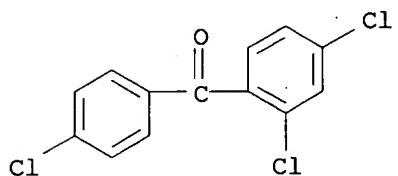
CM 1

CRN 463954-50-9
CMF C25 H16 Cl2 O3



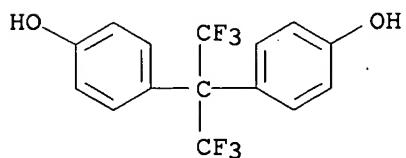
CM 2

CRN 33146-57-5
CMF C13 H7 Cl3 O



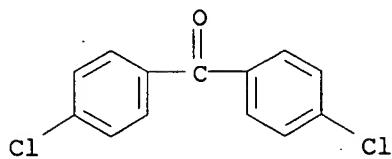
CM 3

CRN 1478-61-1
CMF C15 H10 F6 O2



CM 4

CRN 90-98-2
CMF C13 H8 Cl2 O



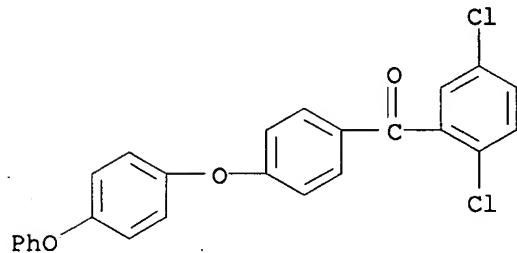
RN 509075-83-6 HCAPLUS

CN Methanone, [[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis(4,1-phenyleneoxy-4,1-phenylene)]bis[(4-chlorophenyl)-, polymer with (4-chlorophenyl)(2,4-dichlorophenyl)methanone and (2,5-dichlorophenyl)[4-(4-phenoxyphenoxy)phenyl]methanone (9CI) (CA INDEX NAME)

CM 1

CRN 463954-50-9

CMF C25 H16 Cl2 O3

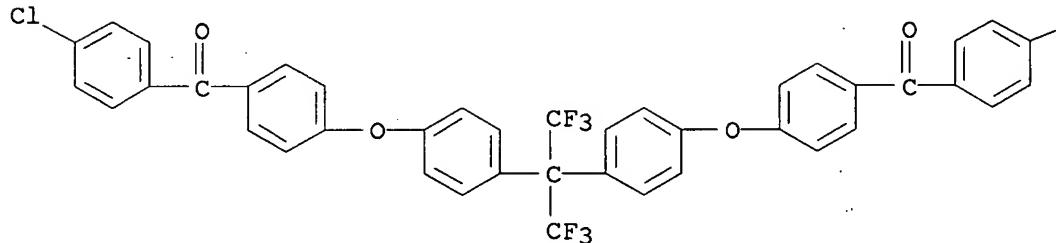


CM 2

CRN 389634-34-8

CMF C41 H24 Cl2 F6 O4

PAGE 1-A

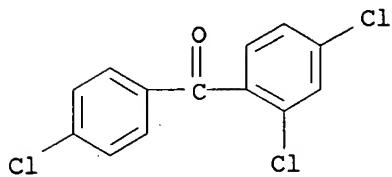


PAGE 1-B

_Cl

CM 3

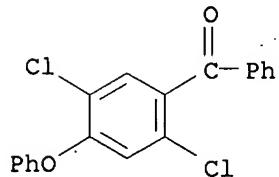
CRN 33146-57-5
CMF C13 H7 Cl3 O



RN 509075-84-7 HCAPLUS
CN Methanone, bis(4-chlorophenyl)-, polymer with (4-chlorophenyl)(2,4-dichlorophenyl)methanone and (2,5-dichloro-4-phenoxyphenyl)phenylmethanone (9CI) (CA INDEX NAME)

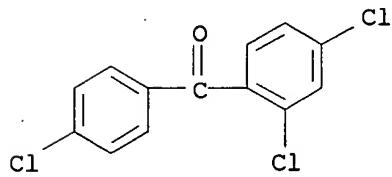
CM 1

CRN 444889-36-5
CMF C19 H12 Cl2 O2



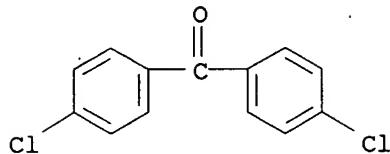
CM 2

CRN 33146-57-5
CMF C13 H7 Cl3 O



CM 3

CRN 90-98-2
CMF C13 H8 Cl2 O



L16 ANSWER 3 OF 30 HCPLUS COPYRIGHT 2003 ACS
 AN 2003:216958 HCPLUS
 DN 138:239119
 TI Crosslinked polymer **electrolytes** with high proton conductivity and durability and their manufacture
 IN Okaniwa, Motoki; Goto, Kohei
 PA JSR Ltd., Japan
 SO Jpn. Kokai Tokkyo Koho, 19 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM C08F002-44
 ICS C08F283-00; H01B001-06; H01B013-00; H01M008-02; H01M008-10
 CC 38-3 (Plastics Fabrication and Uses)
 Section cross-reference(s): 52, 76
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2003082012	A2	20030319	JP 2001-275421	20010911
PRAI	JP 2001-275421		20010911		

AB The polymer **electrolytes** for fuel cell proton-conductive membranes, battery **electrolytes**, displays, sensors, capacitors, ion-exchange membranes, etc., are manufd. by polymg. monomers having .gtoreq.2 radical-polymerizable groups in the presence of proton-conductive polymers and have insol. to N-methylpyrrolidone .gtoreq.40%. Thus, bisphenol AF-4,4'-dichlorobenzophenone oligomer was reacted with 2,5-dichloro-4'-(4-phenoxy)benzophenone to give a copolymer, which was reacted with H₂SO₄. A mixt. contg. the sulfonated polymer and Kayarad DPFA (dipentaerythritol hexaacrylate-dipentaerythritol pentaacrylate mixt.) was processed to give a crosslinked polymer film showing high proton cond. and tensile strength.

ST sulfonated polymer crosslinking **electrolyte** proton cond; dipentaerythritol hexaacrylate pentaerythritol pentaacrylate crosslinker polymer **electrolyte**

IT Conducting polymers

Electrolytes
 (crosslinked polymer **electrolytes** with high proton cond. and durability and their manuf.)

IT 77641-99-7, Kayarad DPFA.
 RL: RCT (Reactant); TEM (Technical or engineered material use); RACT (Reactant or reagent); USES (Uses)
 (crosslinking agent; crosslinked polymer **electrolytes** with high proton cond. and durability and their manuf.)

IT 364062-39-5DP, 4,4'-Dichlorobenzophenone-2,5-dichloro-4'-phenoxybenzophenone copolymer, sulfonated 463963-71-5DP, Bisphenol AF-4,4'-dichlorobenzophenone-2,5-dichloro-4'-(4-phenoxy)benzophenone copolymer, sulfonated

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(dipentaerythritol hexaacrylate- and dipentaerythritol pentaacrylate-crosslinked; crosslinked polymer electrolytes with high proton cond. and durability and their manuf.)

IT 364062-39-5DP, 4,4'-Dichlorobenzophenone-2,5-dichloro-4'-(4-phenoxy)benzophenone copolymer, sulfonated 463963-71-5DP, Bisphenol AF-4,4'-dichlorobenzophenone-2,5-dichloro-4'-(4-phenoxy)benzophenone copolymer, sulfonated
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(dipentaerythritol hexaacrylate- and dipentaerythritol pentaacrylate-crosslinked; crosslinked polymer electrolytes with high proton cond. and durability and their manuf.)

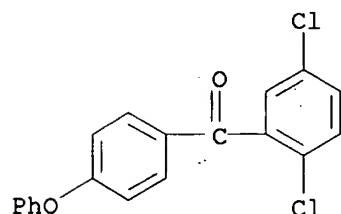
RN 364062-39-5 HCPLUS

CN Methanone, bis(4-chlorophenyl)-, polymer with (2,5-dichlorophenyl)(4-phenoxyphenyl)methanone (9CI) (CA INDEX NAME)

CM 1

CRN 151173-25-0

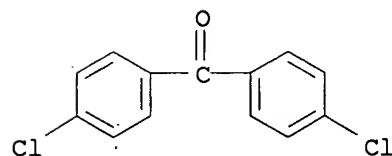
CMF C19 H12 Cl2 O2



CM 2

CRN 90-98-2

CMF C13 H8 Cl2 O



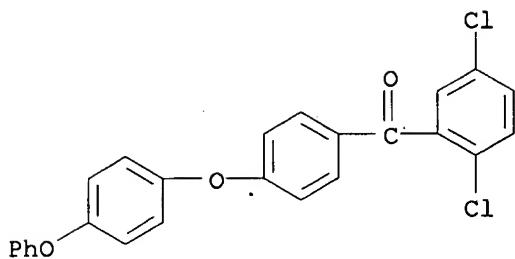
RN 463963-71-5 HCPLUS

CN Methanone, bis(4-chlorophenyl)-, polymer with (2,5-dichlorophenyl)[4-(4-phenoxyphenoxy)phenyl]methanone and 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[phenol] (9CI) (CA INDEX NAME)

CM 1

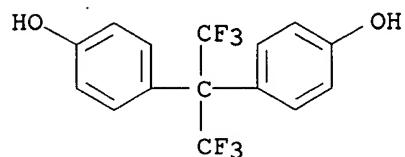
CRN 463954-50-9

CMF C25 H16 Cl2 O3



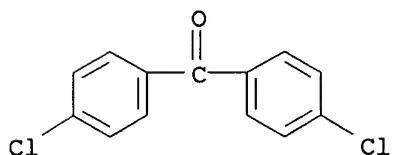
CM 2

CRN 1478-61-1
CMF C15 H10 F6 O2



CM 3

CRN 90-98-2
CMF C13 H8 Cl2 O



L16 ANSWER 4 OF 30 HCPLUS COPYRIGHT 2003 ACS
AN 2003:173096 HCPLUS
DN 138:207828
TI Polymer **electrolyte** composition and **fuel cell**
IN Hidaka, Yasuaki; Iwasaki, Katsuhiko
PA Sumitomo Chemical Company, Limited, Japan
SO Eur. Pat. Appl., 23 pp.
CODEN: EPXXDW
DT Patent
LA English
IC ICM H01M008-10
ICS C08K005-00
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1289041	A2	20030305	EP 2002-17695	20020807
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, SK				
	JP 2003151346	A2	20030523	JP 2002-145863	20020521
	CN 1405217	A	20030326	CN 2002-142573	20020807
PRAI	JP 2001-241897	A	20010809		
	JP 2001-261127	A	20010830		
OS	MARPAT 138:207828				
AB	A polymer electrolyte compn.. comprising a polymer electrolyte and at least one of antioxidant selected from a group which consists of an antioxidant contg. trivalent phosphorous and a sulfur-contg. antioxidant is provided as a polymer electrolyte compn. superior in radical resistance property.				
ST	polymer electrolyte compn antioxidant additive fuel cell				
IT	Organic compounds, uses RL: TEM (Technical or engineered material use); USES (Uses) (aliph., polymers, porous support; polymer electrolyte compn. and fuel cell)				
IT	Antioxidants Fuel cell electrolytes Solid state fuel cells (polymer electrolyte compn. and fuel cell)				
IT	Fluoropolymers, uses RL: TEM (Technical or engineered material use); USES (Uses) (porous support; polymer electrolyte compn. and fuel cell)				
IT	85-60-9, SUMILIZER BBM-S 96-69-5, SUMILIZER WX-R 123-28-4, SUMILIZER TPL-R 693-36-7, SUMILIZER TPS 3806-34-6, ADK Stab PEP-8 16545-54-3, SUMILIZER TPM 26741-53-7, Ultranox 626 29598-76-3, SUMILIZER TP-D 31570-04-4, Sumilizer P-16 80693-00-1 140221-14-3 147192-62-9, GSYP-101 153550-59-5, Sandostab P-EPQ 203255-81-6, Sumilizer GP RL: MOA (Modifier or additive use); USES (Uses) (antioxidant; polymer electrolyte compn. and fuel cell)				
IT	90-43-7DP, [1,1'-Biphenyl]-2-ol, polymer contg., reaction product with hydroxy-terminated polyether sulfone and 4,4'-difluorobenzophenone, sulfonated 92-88-6DP, [1,1'-Biphenyl]-4,4'-diol, polymer contg., reaction product with hydroxy-terminated polyether sulfone and 4,4'-difluorobenzophenone, sulfonated 345-92-6DP, polymer contg., reaction product with hydroxy-terminated polyether sulfone and 4,4'-difluorobenzophenone, sulfonated 25667-42-9DP, Sumikaexcel PES 5003P, polymer contg., reaction product with hydroxy-terminated polyether sulfone and 4,4'-difluorobenzophenone, sulfonated 83094-08-0DP, 4,4'-Dichlorodiphenyl sulfone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenyl sulfone copolymer, sulfonated RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses) (polymer electrolyte compn. and fuel cell)				
IT	83094-08-0DP, 4,4'-Dichlorodiphenyl sulfone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenyl sulfone copolymer, sulfonated RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)				

(polymer electrolyte compn. and fuel cell
)

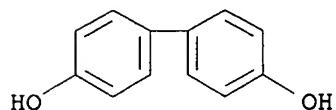
RN 83094-08-0 HCPLUS

CN [1,1'-Biphenyl]-4,4'-diol, polymer with 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

CM 1

CRN 92-88-6

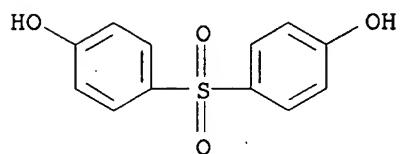
CMF C12 H10 O2



CM 2

CRN 80-09-1

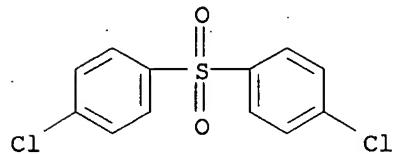
CMF C12 H10 O4 S



CM 3

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



L16 ANSWER 5 OF 30 HCPLUS COPYRIGHT 2003 ACS

AN 2003:48988 HCPLUS

DN 138:356103

TI Fabrication and characterization of heteropoly acid (H₃PW₁₂O₄₀)/directly polymerized sulfonated poly(arylene ether sulfone) copolymer composite membranes for higher temperature fuel cell applications

AU Kim, Yu Seung; Wang, Feng; Hickner, Michael; Zawodzinski, Thomas A.; McGrath, James E.

CS Materials Research Institute, Department of Chemistry, Virginia

Polytechnic Institute and State University, Blacksburg, VA, 24061, USA
SO Journal of Membrane Science (2003), 212(1-2), 263-282
CODEN: JMESDO; ISSN: 0376-7388
PB Elsevier Science B.V.
DT Journal
LA English
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
AB The feasibility of heteropoly acid (HPA)/sulfonated poly(arylene ether sulfone) composite **membranes** for use in proton exchange **membrane fuel cells** was investigated.
Partially disulfonated poly(arylene ether sulfone)s (BPSH) copolymers were prep'd. by direct arom. nucleophilic copolyrn. and soln.-blended with a com. HPA, phosphotungstic acid (H₃PW₁₂O₄₀). Fourier transform IR spectroscopy band shifts showed that sulfonic acid groups on the polymer backbone interact with both bridging tungstic oxide and terminal tungstic oxide in the phosphotungstic acid mol., indicative of an intermol. hydrogen bonding interaction between the copolymer and the HPA additive. The composite **membranes** generally exhibited a low HPA extn. after water vapor treatment, except for the 60 mol% disulfonated BPSH where significant HPA extn. from the composite **membrane** occurred because of excessive matrix swelling. The composite **membrane** not only had good thermal stability (decompn. temp. in nitrogen >300.degree.), but also showed improved mech. strength and lower water uptake than the unfilled **membranes**. The composite **membranes** displayed good proton cond. esp. at elevated temps. (e.g. 130.degree.). For example, fully hydrated **membranes** consisting of 30 wt.% HPA and 70 wt.% BPSH with 40 mol% disulfonation had a cond. of 0.08 S/cm at room temp. which linearly increased up to 0.15 S/cm at 130.degree.. In contrast, the pure copolymer had a proton cond. of 0.07 S/cm at temp. and only reached a max. cond. of 0.09 S/cm, most probably due to dehydration at elevated temps. The dehydration process was monitored by dynamic IR spectra by observing the intensity redn. of the sulfonate group and distinctive changes of shape in the hydroxyl vibrations as the sample was heated. Combining IR results with dynamic thermogravimetric data showed that the composite **membrane** had much higher water retention (at 100-280.degree.) than the pure sulfonated copolymer. Incorporation of HPA into these proton-conducting copolymers should be good candidates for elevated temp. operation of proton exchange **membrane fuel cells**.
ST proton exchange fuel cell **membrane**
sulfonated polyether polysulfone; tungstophosphate sulfonated polyether polysulfone **fuel cell membrane**; dehydration
polyether polysulfone **fuel cell membrane**
IT Polysulfones, uses
RL: DEV (Device component use); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(polyether-, **membranes** with variable sulfonic acid content;
synthesis and characterization of heteropoly acid (H₃PW₁₂O₄₀)/directly polymd. sulfonated poly(arylene ether sulfone) copolymer composite **membranes** for high-temp. **fuel cell** applications)
IT Polyethers, uses
RL: DEV (Device component use); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(polysulfone-, **membranes** with variable sulfonic acid content;
synthesis and characterization of heteropoly acid (H₃PW₁₂O₄₀)/directly polymd. sulfonated poly(arylene ether sulfone) copolymer composite

membranes for high-temp. fuel cell applications)

IT Fuel cell separators
(proton-exchange; synthesis and characterization of heteropoly acid (H3PW12O40)/directly polymd. sulfonated poly(arylene ether sulfone) copolymer composite membranes for high-temp. fuel cell applications)

IT Ionic conductivity
(proton; synthesis and characterization of heteropoly acid (H3PW12O40)/directly polymd. sulfonated poly(arylene ether sulfone) copolymer composite membranes for high-temp. fuel cell applications)

IT Functional groups
(sulfo group; synthesis and characterization of heteropoly acid (H3PW12O40)/directly polymd. sulfonated poly(arylene ether sulfone) copolymer composite membranes for high-temp. fuel cell applications)

IT Functional groups
(sulfonyl group, FT-IR of; synthesis and characterization of heteropoly acid (H3PW12O40)/directly polymd. sulfonated poly(arylene ether sulfone) copolymer composite membranes for high-temp. fuel cell applications)

IT Dehydration
Hydrogen bond
Swelling, physical
(synthesis and characterization of heteropoly acid (H3PW12O40)/directly polymd. sulfonated poly(arylene ether sulfone) copolymer composite membranes for high-temp. fuel cell applications)

IT Heteropoly acids
RL: DEV (Device component use); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(tungstophosphates, composite membranes; synthesis and characterization of heteropoly acid (H3PW12O40)/directly polymd. sulfonated poly(arylene ether sulfone) copolymer composite membranes for high-temp. fuel cell applications)

IT 1343-93-7P
RL: DEV (Device component use); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(composite membranes; synthesis and characterization of heteropoly acid (H3PW12O40)/directly polymd. sulfonated poly(arylene ether sulfone) copolymer composite membranes for high-temp. fuel cell applications)

IT 267877-35-0P, Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with [1,1'-biphenyl]-4,4'-diol and 1,1'-sulfonylbis[4-chlorobenzene]
RL: DEV (Device component use); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(synthesis and characterization of heteropoly acid (H3PW12O40)/directly polymd. sulfonated poly(arylene ether sulfone) copolymer composite membranes for high-temp. fuel cell applications)

RE.CNT 41 THERE ARE 41 CITED REFERENCES AVAILABLE FOR THIS RECORD

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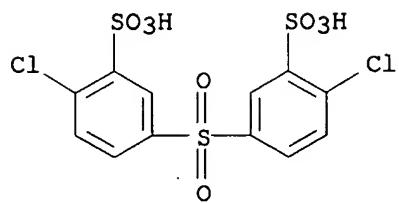
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IT 267877-35-0P, Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with [1,1'-biphenyl]-4,4'-diol and 1,1'-sulfonylbis[4-chlorobenzene]
RL: DEV (Device component use); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
 (synthesis and characterization of heteropoly acid (H3PW12O40)/directly polymd. sulfonated poly(arylene ether sulfone) copolymer composite membranes for high-temp. fuel cell applications)
RN 267877-35-0 HCAPLUS
CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with [1,1'-biphenyl]-4,4'-diol and 1,1'-sulfonylbis[4-chlorobenzene] (9CI)
 (CA INDEX NAME)

CM 1

CRN 51698-33-0

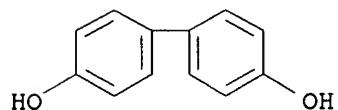
CMF C12 H8 Cl2 O8 S3 . 2 Na



●2 Na

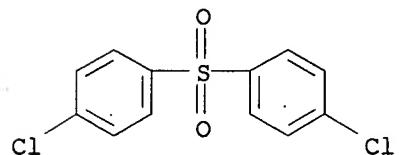
CM 2

CRN 92-88-6
CMF C12 H10 O2



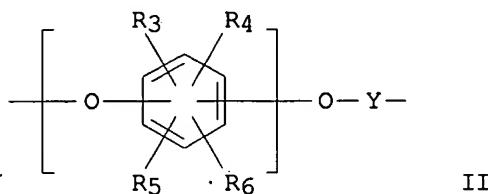
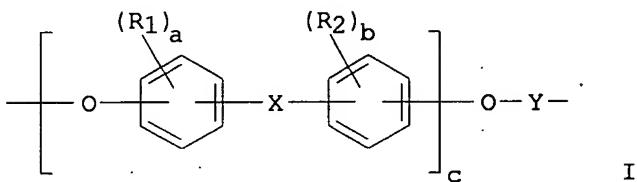
CM 3

CRN 80-07-9
CMF C12 H8 Cl2 O2 S



L16 ANSWER 6 OF 30 HCPLUS COPYRIGHT 2003 ACS
AN 2002:962359 HCPLUS
DN 138:42024
TI Electrode-electrolyte laminate for polymer electrolyte fuel cell
IN Nanaumi, Masaaki; Asano, Yoichi; Kanaoka, Osayuki; Soma, Hiroshi
PA Honda Motor Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 9 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H01M008-02
 ICS C08G065-48; H01M004-96; H01M008-10
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 2002367629	A2	20021220	JP 2001-176696	20010612
PRAI JP 2001-176696		20010612		
GI				



AB The laminate has a polymer electrolyte membrane between a pair of electrodes, where the electrodes has a catalyst layer, contg. 0.01-0.6 mg Pt/cm² loaded on carbonaceous supports having av. particle diam. 10-100 nm, and the electrolyte is a sulfonated polyether contg. repeating units I (X = electron attracting group, R1 sand R2 = H or monovalent hydrocarbon groups, a and b = 0-4 integer, c = 0 or 1, Y = different substituted arom group), or II (R3-6 = H, halogen, or cyano group with .gtoreq.1 of R3-6 = halogen or cyano group).

ST fuel cell sulfonated polyether electrolyte; platinum carbon catalyst fuel cell electrode; electrode polymer electrolyte laminate fuel cell

IT Fuel cell electrodes
(carbon black supports with controlled diam. for platinum catalytic electrodes in fuel cells with sulfonated polyether electrolyte membranes)

IT Carbon black, uses
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(carbon black supports with controlled diam. for platinum catalytic electrodes in fuel cells with sulfonated polyether electrolyte membranes)

IT Fuel cells
(fuel cells with sulfonated polyether electrolyte membranes between platinum catalytic electrodes)

IT Fuel cell electrolytes
(sulfonated polyether electrolyte membranes for fuel cells with platinum catalytic electrodes)

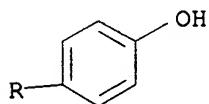
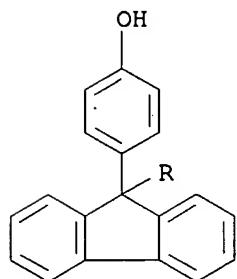
IT 7440-06-4, Platinum, uses
RL: CAT (Catalyst use); USES (Uses)
(platinum catalytic electrodes in fuel cells with sulfonated polyether electrolyte membranes)

IT 41206-07-9D, sulfonated **107087-84-3D**, sulfonated 353454-44-1D, sulfonated **478976-55-5D**, sulfonated
RL: DEV (Device component use); USES (Uses)
(sulfonated polyether **electrolyte membranes** for

fuel cells with platinum catalytic electrodes)
IT 107087-84-3D, sulfonated 478976-55-5D, sulfonated
RL: DEV (Device component use); USES (Uses)
(sulfonated polyether **electrolyte membranes** for
fuel cells with platinum catalytic electrodes)
RN 107087-84-3 HCPLUS
CN Methanone, bis(4-chlorophenyl)-, polymer with 4,4'-(9H-fluoren-9-
ylidene)bis[phenol] (9CI) (CA INDEX NAME)

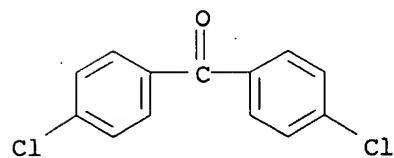
CM 1

CRN 3236-71-3
CMF C25 H18 O2



CM 2

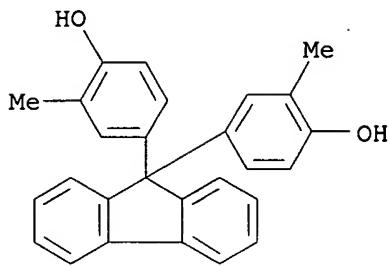
CRN 90-98-2
CMF C13 H8 Cl2 O



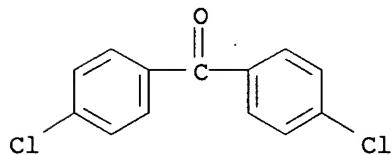
RN 478976-55-5 HCPLUS
CN Methanone, bis(4-chlorophenyl)-, polymer with 4,4'-(9H-fluoren-9-
ylidene)bis[2-methylphenol] (9CI) (CA INDEX NAME)

CM 1

CRN 88938-12-9
CMF C27 H22 O2



CM 2

CRN 90-98-2
CMF C13 H8 Cl2 O

L16 ANSWER 7 OF 30 HCPLUS COPYRIGHT 2003 ACS
 AN 2002:772171 HCPLUS
 DN 137:297365
 TI Process for preparation of polymer **electrolyte** for use as separator in electrochemical devices
 IN Shinoda, Hiroshi; Iwasaki, Katsuhiko; Terahara, Atsushi
 PA Sumitomo Chemical Company, Limited, Japan
 SO Eur. Pat. Appl., 16 pp.
 CODEN: EPXXDW
 DT Patent
 LA English
 IC ICM H01M008-10
 ICS H01M010-40; C08J005-22; C07C311-48; C07C303-36; H01B001-12
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 38

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1248313	A2	20021009	EP 2002-7287	20020402
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				
	US 2002187377	A1	20021212	US 2002-108441	20020329
PRAI	JP 2001-105596	A	20010404		
	JP 2001-297814	A	20010927		
	JP 2001-376904	A	20011211		
AB	A polymer electrolyte has, in a main chain, a structural unit represented by the formula: $-[Ar_1-(SO_2-N(X^+)-SO_2-Ar_2)]_m-SO_2-N(X^+)-SO_2-Ar_1-O-$, where Ar ₁ and Ar ₂ independently represent a divalent arom. groups, m represents an integer of 0-3, and X ⁺ represents an ion selected from H ⁺ , an alkali metal ion, and NH ₄ ⁺ . The polymer electrolyte is sol. in solvents and has excellent film-forming property and recycling				

efficiency.

ST battery separator polymer **electrolyte** prep; **fuel cell** separator polymer **electrolyte** prep

IT Ion exchange
(capacity; process for prepn. of polymer **electrolyte** for use as separator in electrochem. devices)

IT Fluoropolymers, uses
RL: DEV (Device component use); USES (Uses)
(composite **membrane** with; process for prepn. of polymer **electrolyte** for use as separator in electrochem. devices)

IT Fuel cell separators
Polymer **electrolytes**
Primary battery separators
Secondary battery separators
(process for prepn. of polymer **electrolyte** for use as separator in electrochem. devices)

IT Ionic conductivity
(proton; process for prepn. of polymer **electrolyte** for use as separator in electrochem. devices)

IT 9002-84-0, Ptfe
RL: DEV (Device component use); USES (Uses)
(composite **membrane** with; process for prepn. of polymer **electrolyte** for use as separator in electrochem. devices)

IT 468082-63-5P 468082-65-7P **468082-66-8P** 468082-67-9P
468082-68-0P **468082-69-1P** **468082-70-4P**
RL: DEV (Device component use); SPN (**Synthetic preparation**); PREP (**Preparation**); USES (Uses)
(process for prepn. of polymer **electrolyte** for use as separator in electrochem. devices)

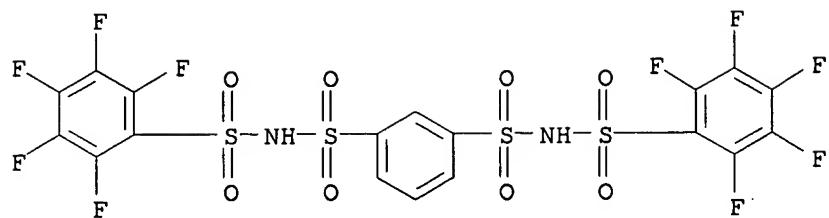
IT **468082-66-8P** **468082-69-1P** **468082-70-4P**
RL: DEV (Device component use); SPN (**Synthetic preparation**); PREP (**Preparation**); USES (Uses)
(process for prepn. of polymer **electrolyte** for use as separator in electrochem. devices)

RN 468082-66-8 HCAPLUS

CN 1,3-Benzenedisulfonamide, N,N'-bis[(pentafluorophenyl)sulfonyl]-, dipotassium salt, polymer with 4,4'-(1-methylethylidene)bis[phenol], 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol], block (9CI) (CA INDEX NAME)

CM 1

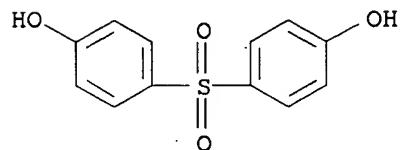
CRN 468082-62-4
CMF C18 H6 F10 N2 O8 S4 . 2 K



●2 K

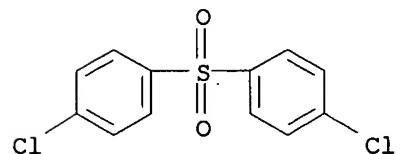
CM 2

CRN 80-09-1
CMF C12 H10 O4 S



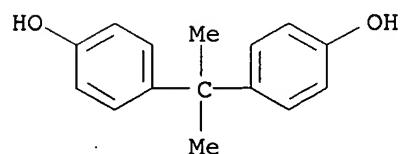
CM 3

CRN 80-07-9
CMF C12 H8 Cl2 O2 S



CM 4

CRN 80-05-7
CMF C15 H16 O2



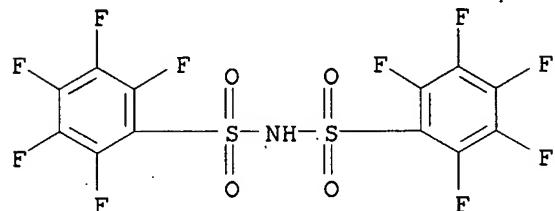
RN 468082-69-1 HCAPLUS

CN Benzenesulfonamide, 2,3,4,5,6-pentafluoro-N-[(pentafluorophenyl)sulfonyl]-, potassium salt, polymer with 1,4-benzenediol, 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol], block (9CI) (CA INDEX NAME)

CM 1

CRN 299914-08-2

CMF C12 H F10 N O4 S2 . K

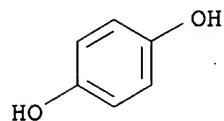


● K

CM 2

CRN 123-31-9

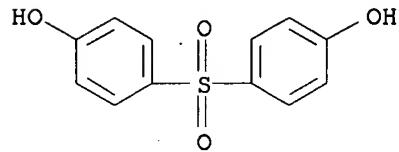
CMF C6 H6 O2



CM 3

CRN 80-09-1

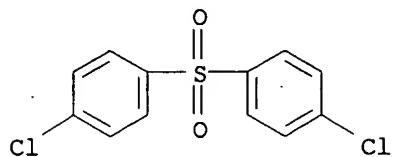
CMF C12 H10 O4 S



CM 4

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



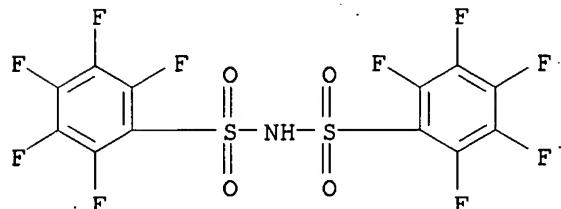
RN 468082-70-4 HCAPLUS

CN Benzenesulfonic acid, 2,5-dihydroxy-, monopotassium salt, polymer with 2,3,4,5,6-pentafluoro-N-[(pentafluorophenyl)sulfonyl]benzenesulfonamide potassium salt, 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol], block (9CI) (CA INDEX NAME)

CM 1

CRN 299914-08-2

CMF C12 H F10 N O4 S2 . K

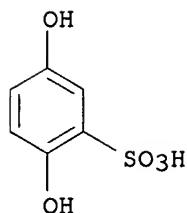


● K

CM 2

CRN 21799-87-1

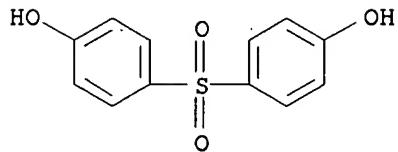
CMF C6 H6 O5 S . K



● K

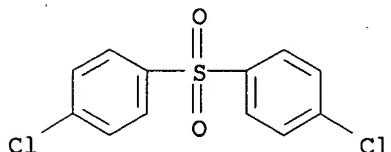
CM 3

CRN 80-09-1
 CMF C12 H10 O4 S



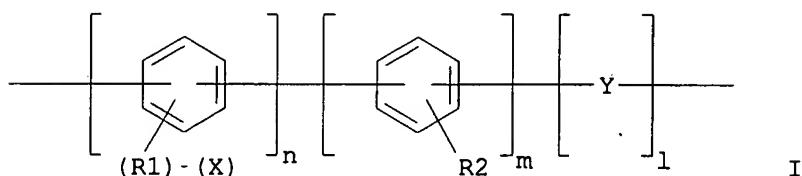
CM 4

CRN 80-07-9
 CMF C12 H8 Cl2 O2 S



L16 ANSWER 8 OF 30 HCPLUS COPYRIGHT 2003 ACS
 AN 2002:752573 HCPLUS
 DN 137:281852
 TI Ion-conducting polymer, **membrane** of the conducting polymer, and **fuel cell**
 IN Morizono, Kenichi; Tsukamoto, Koji
 PA Mitsui Chemicals Inc., Japan
 SO Jpn. Kokai Tokyo Koho, 9 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM H01M008-02
 ICS C08G061-10; H01M008-10
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 38
 FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 2002289222	A2	20021004	JP 2001-88889	20010326
PRAI JP 2001-88889		20010326		
GI				



AB The polymer has protonic acid groups attached to a polymer main chain via spacer structures having .gtoreq.1 C atoms. The polymer is preferably I, where R1 and R2 are H or various substituents, Y = single bond, arylene, heteroarylene group, various org. and inorg. groups or a combination thereof; n = integer .gtoreq.1, m and l = integer .gtoreq.0, and (l+m+n) .gtoreq.4. The polymer is useful as **electrolyte membrane for fuel cells**.

ST fuel cell electrolyte ion conducting polymer membrane

IT Fuel cell electrolytes
(structure of proton conducting polymers for **electrolyte membranes in fuel cells**)

IT 466696-81-1P 466696-82-2P **466696-83-3P**
RL: DEV (Device component use); IMF (Industrial manufacture);
PRP (Properties); PREP (Preparation); USES (Uses)
(structure of proton conducting polymers for **electrolyte membranes in fuel cells**)

IT **466696-83-3P**
RL: DEV (Device component use); IMF (Industrial manufacture);
PRP (Properties); PREP (Preparation); USES (Uses)
(structure of proton conducting polymers for **electrolyte membranes in fuel cells**)

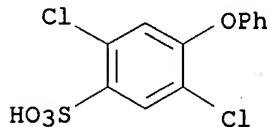
RN 466696-83-3 HCPLUS

CN Benzenesulfonic acid, 2,5-dichloro-4-phenoxy-, polymer with bis(4-chlorophenyl)methanone (9CI) (CA INDEX NAME)

CM 1

CRN 466696-80-0

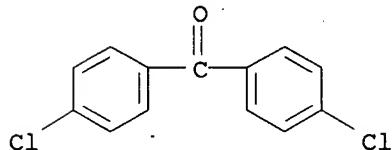
CMF C12 H8 Cl2 O4 S



CM 2

CRN 90-98-2

CMF C13 H8 Cl2 O



AN 2002:736549 HCAPLUS
 DN 137:265674
 TI Fuel cell powered by direct fuel
 IN Andrews, Mark James; Lockley, John Edward; Wilson, Brian
 PA Victrex Manufacturing Limited, UK
 SO PCT Int. Appl., 72 pp.
 CODEN: PIXXD2
 DT Patent
 LA English
 IC ICM H01M008-10
 ICS B01D071-06; C08G065-48; C08J005-22; H01B001-12
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 38

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002075835	A2	20020926	WO 2002-GB1379	20020321
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
PRAI	GB 2001-7075	A	20010321		
	GB 2001-23085	A	20010926		
AB	A fuel cell powered by direct fuel, for example a direct methanol fuel cell, includes a polymer electrolyte membrane which includes a semicryst. polymer. Preferred semicryst. polymers include first repeat units comprising sulfonated arom. group contg. moieties linked by -SO ₂ - and/or -CO- and/or -Q-groups, where Q is O or S and second repeat units which include arom. group contg. moieties linked by -CO- and/or Q groups.				
ST	fuel cell power direct fuel; methanol direct use fuel cell				
IT	Crystallinity Fuel cell electrolytes Solid state fuel cells (fuel cell powered by direct fuel)				
IT	Polysulfones, uses RL: DEV (Device component use); USES (Uses) (polyether-; fuel cell powered by direct fuel)				
IT	Polyethers, uses RL: DEV (Device component use); USES (Uses) (polysulfone-; fuel cell powered by direct fuel)				
IT	Polymers, uses RL: DEV (Device component use); USES (Uses) (semicryst., sulfonated; fuel cell powered by direct fuel)				
IT	27380-27-4DP, sulfonated 31694-16-3DP, PEEK 450P, sulfonated 128324-23-2DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxybenzophenone copolymer, sulfonated 128324-23-2P, 4,4'-Difluorobenzophenone-4,4'-dihydroxybenzophenone-4,4'-dihydroxybiphenyl copolymer 128324-24-3DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenylsulfone copolymer, sulfonated				

128324-24-3P, 4,4'-Difluorobenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenylsulfone copolymer 361482-41-9DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenylsulfone copolymer, sulfonated 361482-41-9P, 4,4'-Difluorobenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenylsulfone copolymer 361482-42-0DP, 4,4'-Difluorobenzophenone-2,4'-dihydroxybiphenyl-4,4'-dihydroxybenzophenone-4,4'-dihydroxybiphenyl copolymer, sulfonated 361482-42-0P, 4,4'-Difluorobenzophenone-2,4'-dihydroxybiphenyl-4,4'-dihydroxybenzophenone 362518-55-6P 362518-57-8P

RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)

(fuel cell powered by direct fuel)

IT 67-64-1, Acetone, uses

RL: PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(fuel cell powered by direct fuel)

IT 362518-55-6P

RL: DEV (Device component use); SPN (Synthetic preparation);

PREP (Preparation); USES (Uses)

(fuel cell powered by direct fuel)

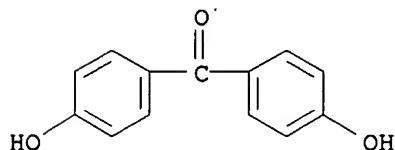
RN 362518-55-6 HCPLUS

CN Methanone, bis(4-fluorophenyl)-, polymer with [1,1'-biphenyl]-4,4'-diol, bis(4-hydroxyphenyl)methanone and 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

CM 1

CRN 611-99-4

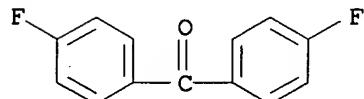
CMF C13 H10 O3



CM 2

CRN 345-92-6

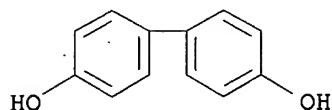
CMF C13 H8 F2 O



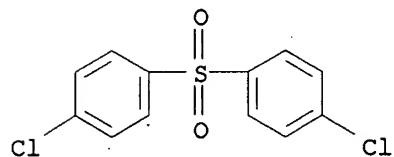
CM 3

CRN 92-88-6

CMF C12 H10 O2



CM 4

CRN 80-07-9
CMF C12 H8 Cl2 O2 S

L16 ANSWER 10 OF 30 HCPLUS COPYRIGHT 2003 ACS
 AN 2002:693172 HCPLUS
 DN 137:201741
 TI Aromatic polyether containing phosphonate groups and a process for the manufacture thereof
 IN Sasaki, Shigeru; Yashiro, Arihiro; Hidaka, Yasuaki
 PA Sumitomo Chemical Company, Limited, Japan
 SO Eur. Pat. Appl., 15 pp.
 CODEN: EPXXDW
 DT Patent
 LA English
 IC ICM C08G075-23
 ICS C08G065-48; B01D071-52; B01D071-68
 CC 35-5 (Chemistry of Synthetic High Polymers)
 Section cross-reference(s): 52
 FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1238998	A1	20020911	EP 2002-3124	20020213
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				
	JP 2002241493	A2	20020828	JP 2001-38116	20010215
PRAI	JP 2001-38116	A	20010215		
	JP 2001-125501	A	20010424		
	JP 2001-379819	A	20011213		
AB	Provided is an arom. polymer phosphonic acid deriv. in which a phosphonic acid deriv. group is directly bound to an arom. ring. The arom. polymer phosphonic acid deriv. can be produced by brominating a specific arom. polymer compd. with a brominating agent, then acting thereon trialkyl phosphite in the presence of a nickel halide catalyst to give a phosphonic acid di-ester, and further, by hydrolyzing the di-ester. The arom. polymer phosphonic acid deriv. is excellent in radical resistance and used for a solid polymer type fuel cell. A polymer with				

repeating unit p-C₆H₄SO₂-p-C₆H₄O-p-C₆H₄-pC₆H₄O was brominated with N-bromosuccinimide, then treated with tri-Et phosphate.

ST arom polyether phosphonate group **electrolyte membrane**

IT Bromination

Polymer **electrolytes**
(arom. polyether contg. phosphonate groups and a process for the manuf. thereof)

IT Polyoxyarylenes
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(phosphonate group-contg.; arom. polyether contg. phosphonate groups and a process for the manuf. thereof)

IT Polysulfones, preparation
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyether-, phosphonate group-contg.; arom. polyether contg. phosphonate groups and a process for the manuf. thereof)

IT **Membranes**, nonbiological
(polymer **electrolyte**; arom. polyether contg. phosphonate groups and a process for the manuf. thereof)

IT Polyethers, preparation
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polysulfone-, phosphonate group-contg.; arom. polyether contg. phosphonate groups and a process for the manuf. thereof)

IT 7718-54-9, Nickel (II) chloride, uses
RL: CAT (Catalyst use); USES (Uses)
(arom. polyether contg. phosphonate groups and a process for the manuf. thereof)

IT 122-52-1DP, Triethyl phosphite, reaction products with brominated polyether-polysulfones 25839-81-0DP, brominated, reaction products with tri-Et phosphite 83094-08-0DP, 4,4'-Biphenol-4,4'-dichlorodiphenyl sulfone-4,4'-dihydroxydiphenyl sulfone copolymer, brominated
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(arom. polyether contg. phosphonate groups and a process for the manuf. thereof)

RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Carreno, M; JOURNAL OF ORGANIC CHEMISTRY 1995, V60(16), P5328 HCAPLUS
(2) Djerassi, C; CHEMICAL REVIEWS 1984, P271
(3) Guiver, M; US 4996271 A 1991 HCAPLUS
(4) Jagur-Grodzinski, J; US 4008191 A 1977 HCAPLUS
(5) Kerres, J; WO 0066254 A 2000 HCAPLUS
(6) Khattab, G; US 3748306 A 1973 HCAPLUS

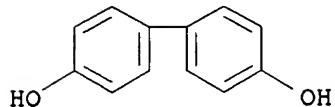
IT 83094-08-0DP, 4,4'-Biphenol-4,4'-dichlorodiphenyl sulfone-4,4'-dihydroxydiphenyl sulfone copolymer, brominated
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(arom. polyether contg. phosphonate groups and a process for the manuf. thereof)

RN 83094-08-0 HCAPLUS

CN [1,1'-Biphenyl]-4,4'-diol, polymer with 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

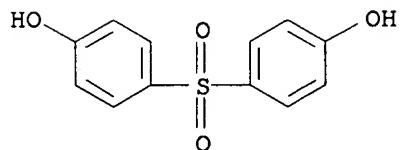
CM 1

CRN 92-88-6
CMF C12 H10 O2



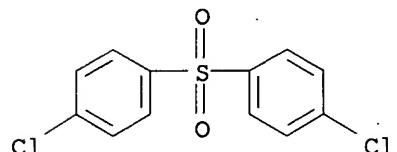
CM 2

CRN 80-09-1
CMF C12 H10 O4 S



CM 3

CRN 80-07-9
CMF C12 H8 Cl2 O2 S



L16 ANSWER 11 OF 30 HCPLUS COPYRIGHT 2003 ACS
AN 2002:685669 HCPLUS
DN 137:353708
TI Carboxylated and Sulfonated Poly(arylene-co-arylene sulfone)s:
Thermostable Polyelectrolytes for Fuel Cell
Applications
AU Poppe, D.; Frey, H.; Kreuer, K. D.; Heinzel, A.; Muelhaupt, R.
CS Freiburger Materialforschungszentrum und Institut fuer Makromolekulare
Chemie, Albert-Ludwigs Universitaet, Freiburg, D-79104, Germany
SO Macromolecules (2002), 35(21), 7936-7941
CODEN: MAMOBX; ISSN: 0024-9297
PB American Chemical Society
DT Journal
LA English
CC 37-3 (Plastics Manufacture and Processing)
Section cross-reference(s): 52

AB The synthesis of novel sol. copolyarylenes, their functionalization with sulfonic and carboxylic acid groups, and the detn. of parameters (swelling behavior, MeOH permeation, and ionic cond.) relevant to use as fuel cells are described. The Ni(0)-catalyzed homocoupling reaction of aryl chlorides was employed for the polymns. Carboxylic acid groups were incorporated by copolymer. of Me 2,5-dichlorobenzoate and subsequent hydrolysis. The compn. varied from 53-100 % carboxylic acid groups. Sulfonic acid groups were introduced by sulfonation with chlorosulfonic acid. Flexible and transparent membranes with sulfonic and/or carboxylic acid groups were prep'd. that exhibited higher proton conductivities (values in the range of $\sigma = 0.11-0.23 \text{ S/cm}$) compared to those of Nafion and sulfonated PEEK as a result of higher ion exchange capacity and water content. Incorporation of carboxylic acid groups led to a reduced water uptake but lower conductivities.

ST carboxylated sulfonated arom thermostable polyelectrolyte fuel cell

IT Polysulfones, preparation
RL: SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(arom.; carboxylated and sulfonated poly(arylene-co-arylene sulfone)s as thermostable polyelectrolytes for fuel cell applications)

IT Fuel cells
Ionic conductivity
Thermal stability
(carboxylated and sulfonated poly(arylene-co-arylene sulfone)s as thermostable polyelectrolytes for fuel cell applications)

IT 474383-94-3DP, 1,3-Dichlorobenzene-4,4'-dichlorodiphenyl sulfone copolymer, sulfonated 474383-95-4DP, 1,3-Dichlorobenzene-4,4'-dichlorodiphenyl sulfone-methyl 2,5-dichlorobenzoate copolymer, hydrolyzed
RL: SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(carboxylated and sulfonated poly(arylene-co-arylene sulfone)s as thermostable polyelectrolytes for fuel cell applications)

RE.CNT 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

- (1) Bloom, P; J Polym Sci, Part A: Polym Chem 2001, V39, P3505 HCPLUS
- (2) Bloom, P; Macromolecules 2001, V34, P1627 HCPLUS
- (3) Chaturvedi, V; Macromolecules 1993, V26, P2607 HCPLUS
- (4) Colon, I; J Org Chem 1986, V51, P2627 HCPLUS
- (5) Colon, I; J Polym Sci, Part A: Polym Chem 1990, V28, P367 HCPLUS
- (6) Ghassemi, H; Polymer 1997, V38, P3139 HCPLUS
- (7) Grob, M; Macromolecules 1996, V29, P7284 HCPLUS
- (8) Havelka-Rivard, P; Macromolecules 1999, V32, P6418 HCPLUS
- (9) Kaeriyama, K; Synth Met 1995, V69, P507 HCPLUS
- (10) Kwiatkowski, G; J Macromol Sci, Pure Appl Chem 1997, VA34, P1945 HCPLUS
- (11) Mulhaupt, R; DE 19535086 A1 1995 HCPLUS
- (12) Percec, V; Macromolecules 1992, V25, P1816 HCPLUS
- (13) Percec, V; Macromolecules 1999, V32, P2597 HCPLUS
- (14) Phillips, R; Macromolecules 1994, V27, P2354 HCPLUS
- (15) Poppe, D; Polym Mater:Sci Eng (Am Chem Soc) 2001, V84(1), P333
- (16) Rehahn, M; Polymer 1989, V30, P1054 HCPLUS
- (17) Wallow, T; J Am Chem Soc 1991, V113, P7411 HCPLUS
- (18) Wallow, T; Polym Prepr 1992, V33(1), P908 HCPLUS

IT 474383-94-3DP, 1,3-Dichlorobenzene-4,4'-dichlorodiphenyl sulfone

copolymer, sulfonated **474383-95-4DP**, 1,3-Dichlorobenzene-4,4'-dichlorodiphenyl sulfone-methyl 2,5-dichlorobenzoate copolymer, hydrolyzed
RL: **SPN (Synthetic preparation)**; TEM (Technical or engineered material use); **PREP (Preparation)**; **USES (Uses)**
(carboxylated and sulfonated poly(arylene-co-arylene sulfone)s as thermostable polyelectrolytes for fuel cell applications)

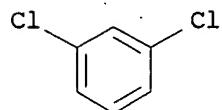
RN 474383-94-3 HCAPLUS

CN Benzene, 1,1'-sulfonylbis[4-chloro-, polymer with 1,3-dichlorobenzene (9CI) (CA INDEX NAME)

CM 1

CRN 541-73-1

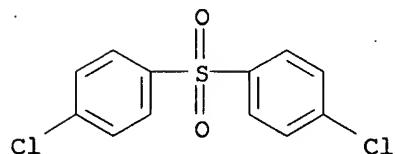
CMF C6 H4 Cl2



CM 2

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



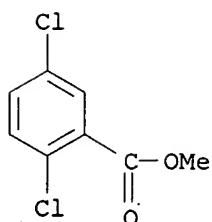
RN 474383-95-4 HCAPLUS

CN Benzoic acid, 2,5-dichloro-, methyl ester, polymer with 1,3-dichlorobenzene and 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

CM 1

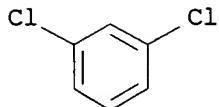
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CMF C8 H6 Cl2 O2



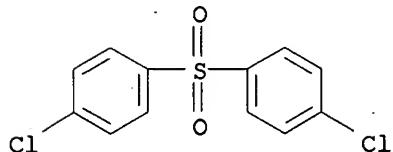
CM 2

CRN 541-73-1
CMF C6 H4 Cl2



CM 3

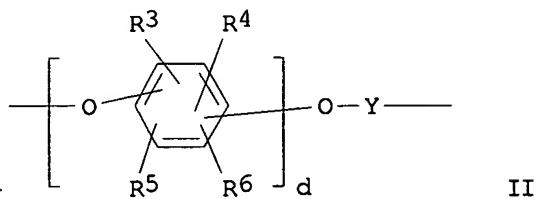
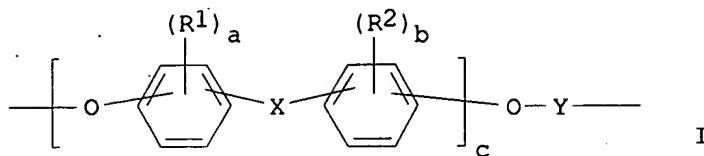
CRN 80-07-9
CMF C12 H8 Cl2 O2 S



L16 ANSWER 12 OF 30 HCPLUS COPYRIGHT 2003 ACS
AN 2002:606433 HCPLUS
DN 137:155541
TI Aromatic polyethers with good sulfonation controllability and proton conductive membranes using them
IN Goto, Kohei; Kakuta, Mayumi; Takahashi, Masayuki
PA JSR Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 13 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM C08G065-34
ICS B01D071-52; B01D071-66; C08G065-48; C08J005-22; H01B001-06;
H01B001-12; H01M006-18; H01M008-02; H01M010-40; C08L071-08
CC 37-3 (Plastics Manufacture and Processing)
Section cross-reference(s): 38, 52, 76

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2002226575	A2	20020814	JP 2001-22639	20010131
PRAI	JP 2001-22639		20010131		
GI					



AB The invention relates to polyethers with Mw 10,000-1,000,000 having repeating units I or II (X = electron-withdrawing divalent group; R₁, R₂ = H, hydrocarbyl; a, b = 0-4; c = 0, 1; Y = aryl-contg. phenylene, biphenylene group, fluorene group, etc.; R₃-6 = H, halo, cyano; d = 1, 2), useful for batteries, capacitors, etc. Thus, 2,5-dihydroxy-4'-methylbiphenyl-4,4'-difluorobenzophenone copolymer was sulfonated and molded into a film showing proton cond. 2.12 times 10⁻³ S/cm, elastic modulus 2.69 GPa, tensile strength 88 MPa, and elongation at break 29%.

ST arom polyether sulfonation proton conductive membrane; fluorobenzophenone hydroxymethylbiphenyl polyether polyketone conductive film

IT Polymer electrolytes
(arom. polyethers with good sulfonation controllability for proton conductive membranes)

IT Membranes, nonbiological
(elec. conductive; arom. polyethers with good sulfonation controllability for proton conductive membranes)

IT Polyketones
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyether-, cardo, sulfonated; arom. polyethers with good sulfonation controllability for proton conductive membranes)

IT Polyketones
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyether-; arom. polyethers with good sulfonation controllability for proton conductive membranes)

IT Polysulfones, preparation
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyether-polyketone-, cardo, sulfonated; arom. polyethers with good sulfonation controllability for proton conductive membranes)

IT Polysulfones, preparation
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyether-polyketone-, sulfonated; arom. polyethers with good sulfonation controllability for proton conductive membranes)

IT Cardo polymers
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(polyether-polyketone-polysulfones, sulfonated; arom. polyethers with good sulfonation controllability for proton conductive membranes)

IT Cardo polymers
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyether-polyketones, sulfonated; arom. polyethers with good sulfonation controllability for proton conductive membranes)

IT Polyketones
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyether-polysulfone-, cardo, sulfonated; arom. polyethers with good sulfonation controllability for proton conductive membranes)

IT Polyketones
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyether-polysulfone-, sulfonated; arom. polyethers with good sulfonation controllability for proton conductive membranes)

IT Polyethers, preparation
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyketone-, cardo, sulfonated; arom. polyethers with good sulfonation controllability for proton conductive membranes)

IT Polyethers, preparation
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyketone-; arom. polyethers with good sulfonation controllability for proton conductive membranes)

IT Polyethers, preparation
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyketone-polysulfone-, cardo, sulfonated; arom. polyethers with good sulfonation controllability for proton conductive membranes)

IT Polyethers, preparation
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyketone-polysulfone-, sulfonated; arom. polyethers with good sulfonation controllability for proton conductive membranes)

IT 40793-56-4DP, 9,9-Bis(4-hydroxyphenyl)fluorene-4,4'-difluorobenzophenone copolymer, sulfonated 41206-07-9DP, sulfonated 118546-87-5DP, sulfonated 125431-09-6DP, sulfonated 445483-05-6DP, 4,4'-Difluorobenzophenone-2,5-dihydroxy-4'-methylbiphenyl copolymer, sulfonated 445483-06-7DP, sulfonated 445483-07-8DP, 9,9-Bis(4-hydroxyphenyl)fluorene-bis(4-hydroxyphenyl)sulfone-4,4'-difluorobenzophenone copolymer, sulfonated 446035-10-5DP, sulfonated
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(arom. polyethers with good sulfonation controllability for proton conductive membranes)

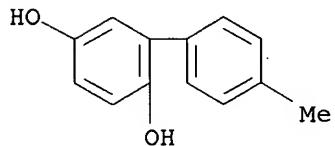
IT 445483-06-7DP, sulfonated
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(arom. polyethers with good sulfonation controllability for proton conductive membranes)

RN 445483-06-7 HCPLUS

CN Methanone, bis(4-fluorophenyl)-, polymer with 4'-methyl[1,1'-biphenyl]-2,5-diol and 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

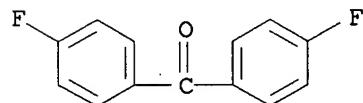
CM 1

CRN 10551-32-3
CMF C13 H12 O2



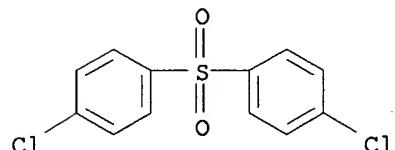
CM 2

CRN 345-92-6
CMF C13 H8 F2 O



CM 3

CRN 80-07-9
CMF C12 H8 Cl2 O2 S



L16 ANSWER 13 OF 30 HCPLUS COPYRIGHT 2003 ACS
AN 2002:592052 HCPLUS
DN 137:141500
TI Sulfonated aromatic polymer compositions, their films, and their use as protonic conductors
IN Goto, Kohei; Takahashi, Masayuki; Onoe, Koichi; Yamakawa, Yoshitaka
PA JSR Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 22 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM C08L071-00
ICS C08G065-40; C08G065-48; C08J005-18; C08L009-02; C08L021-00
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 52, 76

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2002220530	A2	20020809	JP 2001-19377	20010129
PRAI	JP 2001-19377		20010129		
AB	The proton conductors, useful as battery electrolytes , displays, sensors, signal transduction materials, solid-phase capacitors, ion-exchange membranes , etc., comprise films made of compns. contg. sulfonated arom. polymers, vulcanized rubbers, and org. solvents. Thus, 90 parts 10% N-methylpyrrolidone soln. of sulfonated 4,4'-dichlorobenzophenone-2,5-dichloro-4-phenoxybenzophenone copolymer and 10 parts 10% N-methylpyrrolidone dispersion of acrylonitrile-butadiene-divinylbenzene-N-vinylpyrrolidone rubber particles were homogenized, cast on a glass sheet, and dried to give a film with sulfonic acid equiv 2.15 mequiv/g, proton cond. 2.36 .times. 10 ⁻³ S/cm, tensile strength 64 MPa, and elongation at rupture 9%.				
ST	sulfonated arom polymer vulcanized rubber blend film; proton conductor sulfonated arom polyketone rubber blend				
IT	Synthetic rubber, uses RL: IMF (Industrial manufacture); MOA (Modifier or additive use); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses) (acrylonitrile-butadiene-divinylbenzene-methacrylic acid; protonic conductive films of sulfonated arom. polymer compns. contg. vulcanized rubbers)				
IT	Synthetic rubber, uses RL: IMF (Industrial manufacture); MOA (Modifier or additive use); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses) (acrylonitrile-butadiene-divinylbenzene-vinylpyrrolidone; protonic conductive films of sulfonated arom. polymer compns. contg. vulcanized rubbers)				
IT	Polyoxyarylenes RL: IMF (Industrial manufacture); POF (Polymer in formulation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses) (polyketone-, sulfonated; protonic conductive films of sulfonated arom. polymer compns. contg. vulcanized rubbers)				
IT	Polyketones RL: IMF (Industrial manufacture); POF (Polymer in formulation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses) (polyoxyarylene-, sulfonated; protonic conductive films of sulfonated arom. polymer compns. contg. vulcanized rubbers)				
IT	Ionic conductors Plastic films (protonic conductive films of sulfonated arom. polymer compns. contg. vulcanized rubbers)				
IT	Polyketones RL: IMF (Industrial manufacture); POF (Polymer in formulation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses) (sulfonated; protonic conductive films of sulfonated arom. polymer compns. contg. vulcanized rubbers)				
IT	444889-37-6DP, sulfonated 444889-38-7DP, sulfonated RL: IMF (Industrial manufacture); POF (Polymer in formulation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses) (protonic conductive films of sulfonated arom. polymer compns. contg. vulcanized rubbers)				
IT	55340-82-4P, Acrylonitrile-butadiene-divinylbenzene-methacrylic acid copolymer 444889-35-4P RL: IMF (Industrial manufacture); MOA (Modifier or additive use); TEM				

(Technical or engineered material use); PREP (Preparation); USES (Uses)
(rubber; protonic conductive films of sulfonated arom. polymer compns.
contg. vulcanized rubbers)

IT 444889-37-6DP, sulfonated

RL: IMF (Industrial manufacture); POF (Polymer in formulation);
TEM (Technical or engineered material use); PREP (Preparation);
USES (Uses)

(protonic conductive films of sulfonated arom. polymer compns. contg.
vulcanized rubbers)

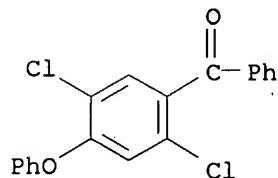
RN 444889-37-6 HCAPLUS

CN Methanone, bis(4-chlorophenyl)-, polymer with (2,5-dichloro-4-
phenoxyphenyl)phenylmethanone (9CI) (CA INDEX NAME)

CM 1

CRN 444889-36-5

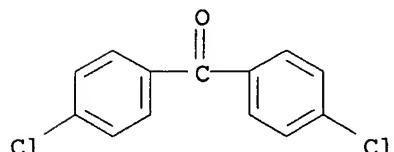
CMF C19 H12 Cl2 O2



CM 2

CRN 90-98-2

CMF C13 H8 Cl2 O



L16 ANSWER 14 OF 30 HCAPLUS COPYRIGHT 2003 ACS

AN 2002:571485 HCAPLUS

DN 137:143007

TI Polymer electrolyte membrane and solid polymer
electrolyte fuel cell

IN Asano, Yoichi; Nanaumi, Masaaki; Kanaoka, Nagayuki; Sohma, Hiroshi; Saito,
Nobuhiro; Matsuo, Junji; Goto, Kohei; Takahashi, Masayuki; Naito, Yuji;
Masaka, Fusazumi

PA Honda Giken Kogyo K.K., Japan; JSR Corp.

SO Ger. Offen., 40 pp.

CODEN: GWXXBX

DT Patent

LA German

IC ICM H01M008-02

ICS B01D071-00

Applicant

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 38

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	DE 10201886	A1	20020801	DE 2002-10201886	20020118
	JP 2002216797	A2	20020802	JP 2001-12361	20010119
	JP 3412762	B2	20030603		
	JP 2002216798	A2	20020802	JP 2001-12362	20010119
	JP 3412763	B2	20030603		
	JP 2002216790	A2	20020802	JP 2001-12363	20010119
	JP 3411562	B2	20030603		
	JP 2002216799	A2	20020802	JP 2001-12489	20010119
	US 2002172850	A1	20021121	US 2002-51199	20020122
PRAI	JP 2001-12361	A	20010119		
	JP 2001-12362	A	20010119		
	JP 2001-12363	A	20010119		
	JP 2001-12489	A	20010119		

AB A polymer composite **electrolyte membrane** is formed from a first polymer **electrolyte** comprising a sulfonated polyarylene polymer and a second polymer **electrolyte** comprising an another hydrocarbon polymer **electrolyte**. The first polymer **electrolyte** consists of 2-70 mol% of an arom. compd. unit with an electron-attractive group in its main chain, while 30-98 mol% of it consist of an arom. compd. unit without electron-attractive group in the main chain. The second polymer **electrolyte** is a **sulfonated polyether electrolyte** or a sulfonated polysulfide **electrolyte**. The polymer composite **electrolyte membrane** is formed from a matrix, which covers the first polymer **electrolyte**, selected from sulfonated polyarylene polymers, and contains an ion exchange capacity of >1.5 meq/g, but <3.0 meq/g, which is carried on a reinforcement; the second polymer **electrolyte** has an ion exchange capacity of >0.5 meq/g, but <1.5 meq/g. The polymer **electrolyte membrane** covers a polyarylene polymer, which is so sulfonated that the Q-value lies within the range of 0.09-0.18 C/cm².

ST fuel cell polymer composite **electrolyte membrane**

IT Polymers, uses

RL: DEV (Device component use); USES (Uses)
 (arom., sulfonated; polymer **electrolyte membrane** and solid polymer **electrolyte fuel cell**)

IT Ion exchange

(capacity; polymer **electrolyte membrane** and solid polymer **electrolyte fuel cell**)

IT Silicates, uses

RL: MOA (Modifier or additive use); USES (Uses)
 (phyllo-; polymer **electrolyte membrane** and solid polymer **electrolyte fuel cell**)

IT Polyketones

RL: DEV (Device component use); USES (Uses)
 (polyether-, sulfonated; polymer **electrolyte membrane** and solid polymer **electrolyte fuel cell**)

IT Polyethers, uses

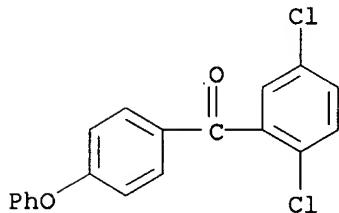
RL: DEV (Device component use); USES (Uses)
 (polyketone-, sulfonated; polymer **electrolyte membrane** and solid polymer **electrolyte fuel cell**)

IT **Membranes**, nonbiological
 Polymer electrolytes
 Solid state fuel cells
 (**polymer electrolyte membrane** and **solid polymer electrolyte fuel cell**)
IT Hydrocarbons, uses
 RL: DEV (Device component use); USES (Uses)
 (**polymers**, sulfonated; **polymer electrolyte membrane** and **solid polymer electrolyte fuel cell**)
IT Polyethers, uses
 Polyoxyphenylenes
 Polysulfides
 Polythiophenylenes
 RL: DEV (Device component use); USES (Uses)
 (sulfonated; **polymer electrolyte membrane** and **solid polymer electrolyte fuel cell**)
IT 7440-06-4, Platinum, uses
 RL: CAT (Catalyst use); DEV (Device component use); USES (Uses)
 (**polymer electrolyte membrane** and **solid polymer electrolyte fuel cell**)
IT 151173-26-1P 364062-39-5P
 RL: DEV (Device component use); SPN (**Synthetic preparation**);
 PREP (**Preparation**); USES (Uses)
 (**polymer electrolyte membrane** and **solid polymer electrolyte fuel cell**)
IT 364062-39-5P
 RL: DEV (Device component use); SPN (**Synthetic preparation**);
 PREP (**Preparation**); USES (Uses)
 (**polymer electrolyte membrane** and **solid polymer electrolyte fuel cell**)
RN 364062-39-5 HCPLUS
CN Methanone, bis(4-chlorophenyl)-, polymer with (2,5-dichlorophenyl)(4-phenoxyphenyl)methanone (9CI) (CA INDEX NAME)

CM 1

CRN 151173-25-0

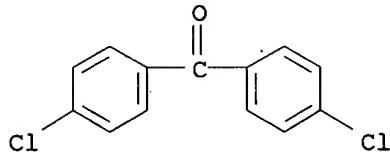
CMF C19 H12 Cl2 O2



CM 2

CRN 90-98-2

CMF C13 H8 Cl2 O



L16 ANSWER 15 OF 30 HCAPLUS COPYRIGHT 2003 ACS
AN 2002:281429 HCAPLUS
DN 137:79794
TI Proton exchange **membrane** nanocomposites
AU Hickner, Michael A.; Kim, YuSeung; Wang, Feng; McGrath, James E.;
Zawodzinski, Thomas A.
CS Department of Chemistry and Materials Research Institute, Virginia
Polytechnic Institute and State University, Blacksburg, VA, 24061, USA
SO Proceedings of the American Society for Composites, Technical Conference
(2001), 16th, 323-336
CODEN: PAMTEG; ISSN: 1084-7243
PB CRC Press LLC
DT Journal; (computer optical disk)
LA English
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 35, 37, 52
AB Polymeric **membrane** nanocomposites incorporating phosphotungstic
acid were synthesized as candidates for **fuel cell**
proton exchange **membranes**. The matrix polymers for the
nanocomposites were sulfonated poly(arylene ether sulfone)s. The main
goal of this research is to improve upon purely polymeric proton exchange
membranes and allow the **fuel cell** to be run at
temps. greater than 100.degree.C. The phosphotungstic acid serves to
improve the protonic cond. of the **membrane** while decreasing the
water absorption. This is a surprising result, as with most sulfonic
acid-base **membranes**, protonic cond. has been directly related to
membrane water content. In addn., the inorg. filler also improves
the modulus of the material.
ST sulfonated polyarylene polyether polysulfone polyelectrolyte
phosphotungstic acid nanocomposite **membrane**; protonic cond water
absorption modulus nanocomposite **membrane** **fuel**
cell
IT **Membranes**, nonbiological
(composite; proton exchange **membrane** nanocomposites of
sulfonated poly(arylene ether sulfone)s/phosphotungstic acid)
IT Sulfonation
(effect on properties of **membrane** nanocomposites of
sulfonated poly(arylene ether sulfone)s/phosphotungstic acid)
IT Polyelectrolytes
(**membrane** nanocomposites of sulfonated poly(arylene ether
sulfone)s/phosphotungstic acid)
IT Phase separation
(micro-; in **membrane** nanocomposites of sulfonated
poly(arylene ether sulfone)s/phosphotungstic acid)
IT Polymer morphology
Storage modulus
Stress-strain relationship
(of **membrane** nanocomposites of sulfonated poly(arylene ether

sulfone)s/phosphotungstic acid)

IT Fuel cell separators
(of nanocomposites of sulfonated poly(arylene ether sulfone)s/phosphotungstic acid)

IT Polysulfones, uses
RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyether-, arom., sulfonated; proton exchange **membrane** nanocomposites of sulfonated poly(arylene ether sulfone)s/phosphotungstic acid)

IT Polysulfones, uses
RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyether-, arom.; proton exchange **membrane** nanocomposites of poly(arylene ether sulfone)s/phosphotungstic acid)

IT Polyethers, uses
RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polysulfone-, arom., sulfonated; proton exchange **membrane** nanocomposites of sulfonated poly(arylene ether sulfone)s/phosphotungstic acid)

IT Polyethers, uses
RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polysulfone-, arom.; proton exchange **membrane** nanocomposites of poly(arylene ether sulfone)s/phosphotungstic acid)

IT Nanocomposites
(proton exchange **membrane** nanocomposites of sulfonated poly(arylene ether sulfone)s/phosphotungstic acid)

IT Ionic conductivity
(proton; of **membrane** nanocomposites of sulfonated poly(arylene ether sulfone)s/phosphotungstic acid)

IT 7732-18-5, Water, uses
RL: NUU (Other use, unclassified); USES (Uses)
(absorption; of **membrane** nanocomposites of sulfonated poly(arylene ether sulfone)s/phosphotungstic acid)

IT 80-07-9, 4,4'-Dichlorodiphenylsulfone
RL: RCT (Reactant); RACT (Reactant or reagent)
(in sulfonation reaction to prep. monomer and in polymn.)

IT 51698-33-0P
RL: PNU (Preparation, unclassified); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)
(monomer; prepn. of and in synthesis of sulfonated poly(arylene ether sulfone)s)

IT 25608-64-4P, 4,4'-Biphenol-4,4'-Dichlorodiphenylsulfone copolymer
25839-81-0P, 4,4'-Biphenol-4,4'-Dichlorodiphenylsulfone copolymer, sru
RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(proton exchange **membrane** nanocomposites of poly(arylene ether sulfone)s/phosphotungstic acid)

IT 1343-93-7, Phosphotungstic acid 12067-99-1, Phosphotungstic acid
RL: MOA (Modifier or additive use); USES (Uses)
(proton exchange **membrane** nanocomposites of sulfonated

poly(arylene ether sulfone)s/phosphotungstic acid)

IT 267877-35-0DP, hydrolyzed

RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(proton exchange membrane nanocomposites of sulfonated poly(arylene ether sulfone)s/phosphotungstic acid)

RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

- (1) Alberti, G; J Memb Sci 2001, V185, P73 HCPLUS
- (2) Malhotra, S; J Electrochem Soc 1997, V144(2), PL23 HCPLUS
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- (7) Wang, F; J Memb Sci, submitted 2001
- (8) Wang, F; Macromol Symp, accepted 2000
- (9) Zaidi, S; J Memb Sci 2000, V173, P17 HCPLUS
- (10) Zawodzinski, T; J Phys Chem 1991, V95, P6040 HCPLUS

IT 25608-64-4P, 4,4'-Biphenol-4,4'-Dichlorodiphenylsulfone copolymer

RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(proton exchange membrane nanocomposites of poly(arylene ether sulfone)s/phosphotungstic acid)

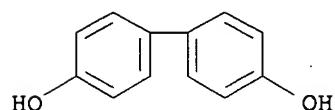
RN 25608-64-4 HCPLUS

CN [1,1'-Biphenyl]-4,4'-diol, polymer with 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

CM 1

CRN 92-88-6

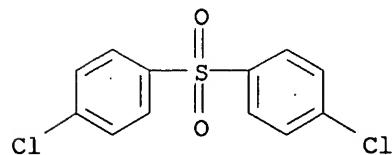
CMF C12 H10 O2



CM 2

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



IT 267877-35-0DP, hydrolyzed

RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(proton exchange membrane nanocomposites of sulfonated poly(arylene ether sulfone)s/phosphotungstic acid)

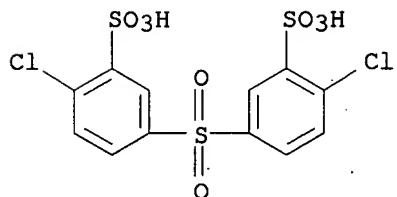
RN 267877-35-0 HCAPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with [1,1'-biphenyl]-4,4'-diol and 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

CM 1

CRN 51698-33-0

CMF C12 H8 Cl2 O8 S3 . 2 Na

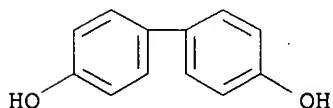


●2 Na

CM 2

CRN 92-88-6

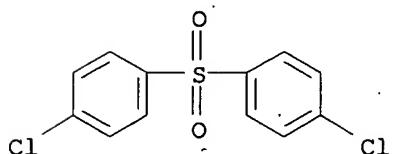
CMF C12 H10 O2



CM 3

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



L16 ANSWER 16 OF 30 HCAPLUS COPYRIGHT 2003 ACS
 AN 2002:241166 HCAPLUS
 DN 136:265821
 TI Ion-conducting sulfonated polymeric materials
 IN McGrath, James E.; Hickner, Michael; Wang, Feng; Kim, Yu-Seung
 PA Virginia Tech Intellectual Properties, Inc., USA
 SO PCT Int. Appl., 46 pp.
 CODEN: PIXXD2
 DT Patent
 LA English
 IC ICM H01M008-10
 ICS C08G069-26; C08G075-00
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 37

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE	
PI	WO 2002025764	A1	20020328	WO 2001-US29293	20010920	
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG		
	AU 2001092804	A5	20020402	AU 2001-92804	20010920	
	US 2002091225	A1	20020711	US 2001-956256	20010920	
PRAI	US 2000-234177P	P	20000920			
	US 2001-311350P	P	20010813			
	US 2001-311360P	P	20010813			
	WO 2001-US29293	W	20010920			
AB	Sulfonated polymers are made by the direct polymerization of a sulfonated monomer to form the sulfonated polymers. The types of sulfonated polymers may include polysulfones or polyimides. The sulfonated polymers can be formed into membranes that may be used in proton exchange membrane fuel cells or as ion exchange membranes. The membranes formed from the sulfonated polymers exhibit improved properties over that of Nafion. A heteropoly acid may be added to the sulfonated polymer to form a nanocomposite membrane in which the heteropoly acid is highly dispersed. The addn. of a heteropoly acid to the sulfonated polymer increases the thermal stability of the membrane, enhances the cond. above 100.degree., and reduces the water uptake of the membrane.					
ST	fuel cell membrane sulfonated polymer heteropoly acid nanocomposite; ion exchange membrane sulfonated polymer heteropoly acid nanocomposite					
IT	Ion exchange membranes (ion-conducting sulfonated polymeric materials)					
IT	Heteropoly acids RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses) (ion-conducting sulfonated polymeric materials)					
IT	Fuel cells (proton exchange membrane; ion-conducting sulfonated polymeric materials)					

IT Polyimides, uses
Polysulfones, uses
RL: DEV (Device component use); SPN (Synthetic preparation); TEM
(Technical or engineered material use); PREP (Preparation); USES (Uses)
(sulfonated; ion-conducting sulfonated polymeric materials)

IT 267877-35-0P 302924-87-4DP, proton exchanged derivs.
302924-87-4P
RL: DEV (Device component use); SPN (Synthetic preparation); TEM
(Technical or engineered material use); PREP (Preparation); USES
(Uses)
(ion-conducting sulfonated polymeric materials)

IT 11104-88-4, Phosphomolybdic acid 12067-99-1, Phosphotungstic acid
13772-29-7
RL: DEV (Device component use); TEM (Technical or engineered material
use); USES (Uses)
(ion-conducting sulfonated polymeric materials)

RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

- (1) Aisin Aw Co Ltd; JP 09245818 1997 HCPLUS
- (2) Mecham, J; Polym Prepr 2000, V41(2), P1388 HCPLUS
- (3) Miller; US 5272217 A 1993 HCPLUS

IT 267877-35-0P
RL: DEV (Device component use); SPN (Synthetic preparation); TEM
(Technical or engineered material use); PREP (Preparation); USES
(Uses)
(ion-conducting sulfonated polymeric materials)

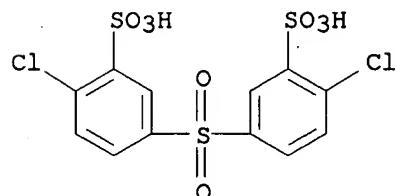
RN 267877-35-0 HCPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer
with [1,1'-biphenyl]-4,4'-diol and 1,1'-sulfonylbis[4-chlorobenzene] (9CI)
(CA INDEX NAME)

CM 1

CRN 51698-33-0

CMF C12 H8 Cl2 O8 S3 . 2 Na

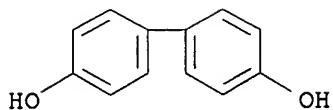


●2 Na

CM 2

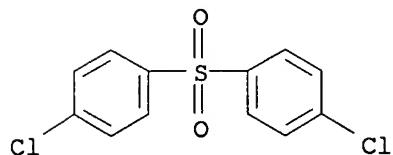
CRN 92-88-6

CMF C12 H10 O2



CM 3

CRN 80-07-9
CMF C12 H8 Cl2 O2 S



L16 ANSWER 17 OF 30 HCPLUS COPYRIGHT 2003 ACS
AN 2002:93463 HCPLUS
DN 136:310780
TI Direct polymerization of sulfonated poly(arylene ether sulfone) random (statistical) copolymers: candidates for new proton exchange **membranes**
AU Wang, Feng; Hickner, Michael; Kim, Yu Seung; Zawodzinski, Thomas A.; McGrath, James E.
CS Department of Chemistry and Materials Research Institute, Virginia Polytechnic Institute and State University, Blacksburg, VA, 24061, USA
SO Journal of Membrane Science (2002), 197(1-2), 231-242
CODEN: JMESDO; ISSN: 0376-7388
PB Elsevier Science B.V.
DT Journal
LA English
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 35
AB Novel biphenol-based wholly arom. poly(arylene ether sulfone)s contg. up to two pendant sulfonate groups per repeat unit were prep'd. by potassium carbonate mediated direct arom. nucleophilic substitution polycondensation of disodium 3,3'-disulfonate-4,4'-dichlorodiphenylsulfone (SDCDPS), 4,4'-dichlorodiphenylsulfone (DCDPS) and 4,4'-biphenol. Copolymer proceeded quant. to high mol. wt. in N-methyl-2-pyrrolidinone at 190 .degree.C. Tough **membranes** with a SDCDPS/DCDPS mole ratio up to 60:40 were successfully cast using N,N-dimethylacetamide. An increase of sulfonate groups in the copolymer resulted in increased glass transition temp., enhanced **membrane** hydrophilicity, and intrinsic viscosity; the 100% SDCDPS homopolymer was water sol. The acid form **membranes** were successfully obtained by treating the sodium form of the **membranes** with dil. sulfuric acid soln. Thermogravimetric anal. shows that the sodium form materials have enhanced thermal stability relative to the acid form, as expected. At. force microscopy (AFM) phase images of the acid form **membranes** clearly show the hydrophilic domains, with sizes increasing from 10 to 25 nm as a function of the degree of sulfonation. A phase inversion could be obsd.

for the .60% SCSDPS copolymer, which was consistent with a rapid increase in water absorption. Short-term aging (30 min) indicates that the desired acid form **membranes** are stable to 220 .degree.C in air and cond. values at 30 .degree.C of 0.11 S/cm (SDCDPS/DCDPS=0.4) and 0.17 S/cm (SDCDPS/DCDPS=0.6) were measured, which are comparable to or higher than the state-of-the-art fluorinated copolymer Nafion 1135 control (0.12 S/cm). The cond. is greatly influenced by ion exchange capacity, temp., and water activity. The new copolymers, which contain ion cond. sites on the deactivated positions of the aryl backbone rings, are candidates as new polymeric **electrolyte** materials for proton exchange **membrane** (PEM) fuel cells.

ST nucleophilic substitution polycondensation disodium disulfonatodichlorodiphenylsulfone dichlorodiphenylsulfone biphenol potassium carbonate; polyether polysulfone **membrane** prepn

IT Electric conductivity
Glass transition temperature
Membranes, nonbiological
Thermal stability
Viscosity
(prepн., thermal, elec., and rheolog. properties of sulfonated poly(arylene ether sulfone) as candidates for new proton exchange **membranes**)

IT Adsorption
(water; prepн., thermal, elec., and rheolog. properties of sulfonated poly(arylene ether sulfone) as candidates for new proton exchange **membranes**)

IT 584-08-7, Potassium carbonate
RL: CAT (Catalyst use); USES (Uses)
(prepн., thermal, elec., and rheolog. properties of sulfonated poly(arylene ether sulfone) as candidates for new proton exchange **membranes**)

IT 267877-35-0P
RL: PRP (Properties); RCT (Reactant); SPN (**Synthetic preparation**); TEM (Technical or engineered material use); PREP (**Preparation**); RACT (Reactant or reagent); USES (Uses)
(prepн., thermal, elec., and rheolog. properties of sulfonated poly(arylene ether sulfone) as candidates for new proton exchange **membranes**)

IT 267877-35-0DP, hydrolyzed
RL: PRP (Properties); SPN (**Synthetic preparation**); TEM (Technical or engineered material use); PREP (**Preparation**); USES (Uses)
(prepн., thermal, elec., and rheolog. properties of sulfonated poly(arylene ether sulfone) as candidates for new proton exchange **membranes**)

RE.CNT 37 THERE ARE 37 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

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- (16) McGrath, J; ACS Symp Ser 1999
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- (35) Xue, Y; Macromolecules 1997, V30, P3803 HCPLUS
- (36) Zaidi, S; J Membr Sci 2000, V173, P17 HCPLUS
- (37) Zawodzinski, T; J Electrochem Soc 1993, V140(7), P1981 HCPLUS

IT 267877-35-0P

RL: PRP (Properties); RCT (Reactant); SPN (Synthetic preparation)
; TEM (Technical or engineered material use); PREP (Preparation)
; RACT (Reactant or reagent); USES (Uses)
(prepn., thermal, elec., and rheolog. properties of sulfonated
poly(arylene ether sulfone) as candidates for new proton exchange
membranes)

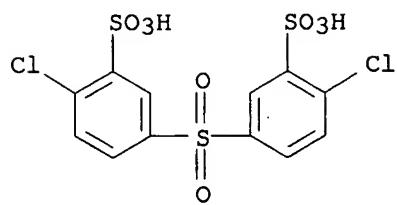
RN 267877-35-0 HCPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer
with [1,1'-biphenyl]-4,4'-diol and 1,1'-sulfonylbis[4-chlorobenzene] (9CI)
(CA INDEX NAME)

CM 1

CRN 51698-33-0

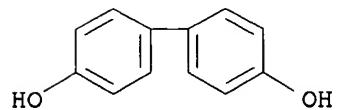
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●2 Na

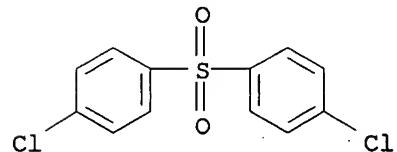
CM 2

CRN 92-88-6
CMF C12 H10 O2



CM 3

CRN 80-07-9
CMF C12 H8 Cl2 O2 S



IT 267877-35-0DP, hydrolyzed

RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

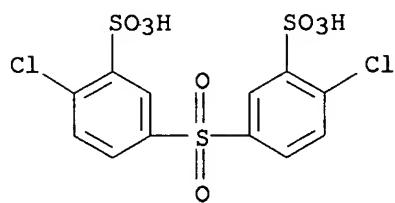
(prepn., thermal, elec., and rheolog. properties of sulfonated poly(arylene ether sulfone) as candidates for new proton exchange membranes)

RN 267877-35-0 HCAPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with [1,1'-biphenyl]-4,4'-diol and 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

CM 1

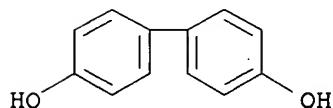
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CMF C12 H8 Cl2 O8 S3 . 2 Na



●2 Na

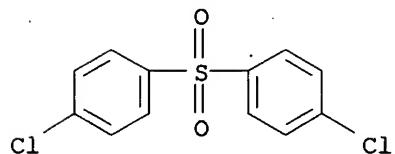
CM 2

CRN 92-88-6
CMF C12 H10 O2



CM 3

CRN 80-07-9
CMF C12 H8 Cl2 O2 S



L16 ANSWER 18 OF 30 HCPLUS COPYRIGHT 2003 ACS
AN 2001:846076 HCPLUS
DN 136:102739
TI Synthesis of highly sulfonated poly(arylene ether sulfone) random (statistical) copolymers via direct polymerization
AU Wang, Feng; Hickner, Michael; Ji, Qing; Harrison, William; Mecham, Jeffrey; Zawodzinski, Thomas A.; McGrath, James E.
CS Department of Chemistry and Materials Research Institute (0344), Virginia Polytechnic Institute and State University, Blacksburg, VA, 24061, USA
SO Macromolecular Symposia (2001), 175(Polymerization Processes and Polymer Materials II), 387-395
CODEN: MSYMEC; ISSN: 1022-1360
PB Wiley-VCH Verlag GmbH
DT Journal

LA English
CC 35-5 (Chemistry of Synthetic High Polymers)
AB Novel biphenol-based wholly arom. poly (arylene ether sulfones) contg. pendant sulfonate groups were prep'd. by direct arom. nucleophilic substitution polycondensation of disodium 3,3'-disulfonate-4,4'-dichlorodiphenyl sulfone (SDCDPS), 4,4'-dichlorodiphenylsulfone (DCDPS) and biphenol. Copolylmn. proceeded quant. to high mol. wt. in N-methyl-2-pyrrolidinone at 190.degree.C in the presence of anhyd. potassium carbonate. Tough membranes were successfully cast from the control and the copolymers, which had a SDCDPS/DCDPS mole ratio of either 40:60 or 60:40 using N,N-dimethylacetamide; the 100% SDCDPS homopolymer was water sol. Short-term aging (30 min) indicates that the desired acid form membranes are stable to 220.degree.C in air and cond. values at 25.degree.C of 0.110 (40%) and 0.170 S/cm (60%) were measured, which are comparable to or higher than the state-of-the art fluorinated copolymer Nafion 1135 control. The new copolymers, which contain ion cond. sites on deactivated rings, are candidates as new polymeric electrolyte materials for proton exchange membrane (PEM) fuel cells. Further research comparing their membrane behavior to post-sulfonated systems is in progress.
ST sulfonated polyarylene ether
IT Polysulfones, preparation
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation) (polyether-, arom.; synthesis of highly sulfonated poly(arylene ether sulfone) via direct polymn.)
IT Polyethers, preparation
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation) (polysulfone-, arom.; synthesis of highly sulfonated poly(arylene ether sulfone) via direct polymn.)
IT Electric conductivity
Viscosity
(synthesis of highly sulfonated poly(arylene ether sulfone) via direct polymn.)
IT 267877-35-0DP, reaction products with acids 389600-31-1DP
, reaction products with acids
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(synthesis of highly sulfonated poly(arylene ether sulfone) via direct polymn.)
IT 80-07-9
RL: RCT (Reactant); RACT (Reactant or reagent)
(synthesis of highly sulfonated poly(arylene ether sulfone) via direct polymn.)
IT 51698-33-0P 57570-28-2P
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
(synthesis of highly sulfonated poly(arylene ether sulfone) via direct polymn.)
RE.CNT 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Anon; Macromolecules in preparation
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(5) Gunduz, N; Polymer Preprints 2000, V41(2), P1565 HCPLUS
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- (7) Johnson, B; J of Polym Sci 1984, V22, P721 HCPLUS
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- (14) Robeson, L; Molecular Basis for Transitions and Relaxations 1978, V4, P405 HCPLUS
- (15) Shobha, H; Polymer Preprints 2000, V40(1), P180
- (16) Springer, T; Journal of The Electrochemical Society 1991, V138(8), P2334 HCPLUS
- (17) Tran, C; Thesis Virginia Polytechnic Institute and State University 1980
- (18) Udea, M; J Polym Sci, Polym Chem Ed 1993, V31, P85
- (19) Wang, F; Polymer Preprints 2000, V40(2), P180
- (20) Wang, F; Polymer Preprints 2000, V40(1), P237

IT 267877-35-0DP, reaction products with acids 389600-31-1DP***,
reaction products with acids

RL: PRP (Properties); ***SPN (Synthetic preparation); PREP
(Preparation)

(synthesis of highly sulfonated poly(arylene ether sulfone) via direct
polymn.)

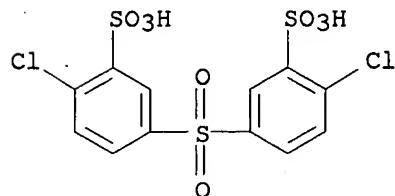
RN 267877-35-0 HCPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer
with [1,1'-biphenyl]-4,4'-diol and 1,1'-sulfonylbis[4-chlorobenzene] (9CI)
(CA INDEX NAME)

CM 1

CRN 51698-33-0

CMF C12 H8 Cl2 O8 S3 . 2 Na

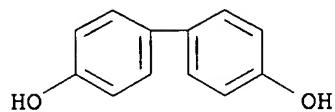


●2 Na

CM 2

CRN 92-88-6

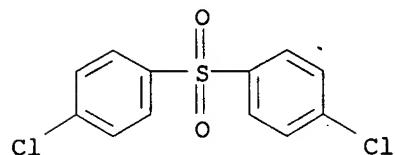
CMF C12 H10 O2



CM 3

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



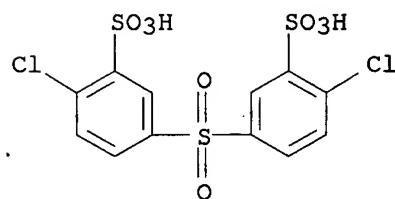
RN 389600-31-1 HCPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with [1,1'-biphenyl]-4,4'-diol (9CI) (CA INDEX NAME)

CM 1

CRN 51698-33-0

CMF C12 H8 Cl2 O8 S3 . 2 Na

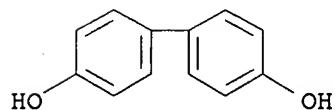


●2 Na

CM 2

CRN 92-88-6

CMF C12 H10 O2



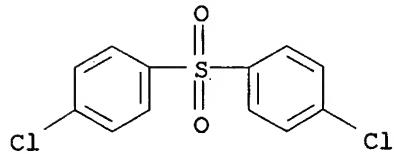
L16 ANSWER 19 OF 30 HCAPLUS COPYRIGHT 2003 ACS
 AN 2001:814335 HCAPLUS
 DN 135:360183
 TI Manufacture of ion exchanging filters for polymer **electrolyte fuel cells** and the **fuel cells**
 IN Terada, Ichiro
 PA Asahi Glass Co., Ltd., Japan
 SO Jpn. Kokai Tokkyo Koho, 6 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM H01M008-06
 ICS B01D069-02; B01D071-26; B01D071-32; C08J005-22; C08J007-00;
 C08J007-04; D06M010-00; D06M010-02; D06M011-52; D06M014-10;
 D06M014-12; H01M008-10; C08L081-06
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 2001313057	A2	20011109	JP 2000-127406	20000427
PRAI JP 2000-127406		20000427		

AB The filters, for purifying H and O supplied to polymer **electrolyte fuel cells**, are prep'd. by treating polyolefin or polyfluoroolefin substrates to form hydrophilic surface, applying an ion exchanger polymer soln. on the treated substrate, and drying. The **fuel cells** are manufd. by using the above method to prep. reaction gas purifying filters.
 ST polymer **electrolyte fuel cell** ion exchanging filter manuf; **fuel cell** reaction gas ion. exchanging filter
 IT Filters
 Fuel cells
 Ion exchangers
 (manuf. of ion exchanger coated hydrophilic polymer filters for polymer **electrolyte fuel cell** reaction gas purifn.)
 IT 25154-01-2P
 RL: IMF (Industrial manufacture); PREP (Preparation)
 (manuf. of ion exchanger coated hydrophilic polymer filters for polymer **electrolyte fuel cell** reaction gas purifn.)
 IT 25135-51-7DP, Udel p 1700, chloromethylated, reaction products with trimethylamine 25135-51-7DP, sulfonated 25154-01-2DP, chloromethylated, reaction products with trimethylamine 26654-97-7DP, sulfonated
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (manuf. of ion exchanger coated hydrophilic polymer filters for polymer **electrolyte fuel cell** reaction gas purifn.)
 IT 25154-01-2P
 RL: IMF (Industrial manufacture); PREP (Preparation)
 (manuf. of ion exchanger coated hydrophilic polymer filters for polymer **electrolyte fuel cell** reaction gas purifn.)
 RN 25154-01-2 HCAPLUS
 CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

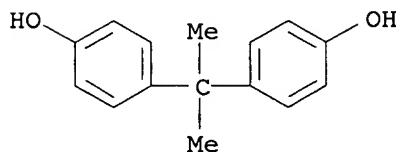
CM 1

CRN 80-07-9
CMF C12 H8 Cl2 O2 S



CM 2

CRN 80-05-7
CMF C15 H16 O2



IT 25154-01-2DP, chloromethylated, reaction products with trimethylamine

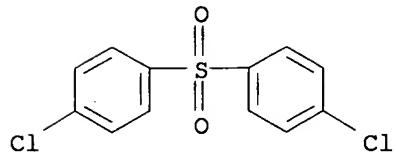
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(manuf. of ion exchanger coated hydrophilic polymer filters for polymer electrolyte fuel cell reaction gas purifn.)

RN 25154-01-2 HCAPLUS

CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

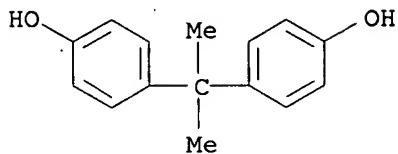
CM 1

CRN 80-07-9
CMF C12 H8 Cl2 O2 S



CM 2

CRN 80-05-7
CMF C15 H16 O2



L16 ANSWER 20 OF 30 HCAPLUS COPYRIGHT 2003 ACS

AN 2001:760440 HCAPLUS

DN 135:304937

TI Preparation of curable polyarylenes bearing sulfonic acid for proton-conductive **membranes**

IN Takahashi, Masayuki; Goto, Kohei; Igarashi, Katsutoshi

PA JSR Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 14 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01B013-00

ICS C08G061-10; C08G061-12; C08J005-18; C08J007-00; H01B001-06; H01B001-12; H01G009-028; H01M006-18; H01M008-10; H01M010-40; C08L065-00

CC 38-3 (Plastics Fabrication and Uses)

Section cross-reference(s): 76

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2001291443	A2	20011019	JP 2000-102976	20000405
PRAI	JP 2000-102976		20000405		

AB Title **membranes** with high H⁺ cond. at wide temp. region, suitable for battery **electrolytes**, solid polyme **electrolytes**, fuel cells, display devices, sensors, capacitors, solid condensers, ion-exchange **membranes**, etc. (no data), are prep'd. by irradiating of sulfonated polyarylene films with electron beam. Thus, a sulfonated poly[(4-phenoxybenzoyl)-1,4-phenylene] was dissolved in DMF, coated on a glass plate, and irradiated with electronic beam 60 Mrad to give a film with H⁺ cond. at 80.degree. 4.2 x 10⁻² S/cm² and exhibiting good strength, durability, and swelling resistance in water at 90.degree..

ST sulfonated polyarylene curable proton conductive **membrane**IT **Membranes**, nonbiological
(elec. conductive, proton conductive; prepn. of curable polyarylenes bearing sulfuric acid for proton-conductive **membranes**)IT Electron beams
(irradn.; prepn. of curable polyarylenes bearing sulfonic acid for proton-conductive **membranes**)IT Polyphenyls
RL: DEV (Device component use); IMF (Industrial manufacture); PRP (Properties); PREP (Preparation); USES (Uses)
(polyketone-, sulfonated; prepn. of curable polyarylenes bearing sulfonic acid for proton-conductive **membranes**)IT Ionic conductors
(polymeric; prepn. of curable polyarylenes bearing sulfonic acid for proton-conductive **membranes**)IT Polyketones
RL: DEV (Device component use); IMF (Industrial manufacture); PRP

(Properties); PREP (Preparation); USES (Uses)
(polyphenyl-, sulfonated; prepn. of curable polyarylenes bearing
sulfonic acid for proton-conductive membranes)

IT Ionic conductivity
(proton; prepn. of curable polyarylenes bearing sulfonic acid for
proton-conductive membranes)

IT Polyphenyls
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or
engineered material use); PREP (Preparation); USES (Uses)
(sulfonated; prepn. of curable polyarylenes bearing sulfonic acid for
proton-conductive membranes)

IT 154100-93-3P, Poly[(4-phenoxybenzoyl)-1,4-phenylene]
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or
engineered material use); PREP (Preparation); USES (Uses)
(intermediate; prepn. of curable polyarylenes bearing sulfonic acid for
proton-conductive membranes)

IT 151173-26-1P, 2,5-Dichloro-4'-phenoxybenzophenone homopolymer
349452-18-2P 364062-39-5P 366801-18-5P
RL: IMF (Industrial manufacture); RCT (Reactant); PREP
(Preparation); RACT (Reactant or reagent)
(intermediate; prepn. of curable polyarylenes bearing sulfonic acid for
proton-conductive membranes)

IT 151173-25-0P, 2,5-Dichloro-4'-phenoxybenzophenone
RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT
(Reactant or reagent)
(monomer; prepn. of curable polyarylenes bearing sulfonic acid for
proton-conductive membranes)

IT 151173-26-1DP, 2,5-Dichloro-4'-phenoxybenzophenone homopolymer, sulfonated
154100-93-3DP, Poly[(4-phenoxy)benzoyl]-1,4-phenylene], sulfonated
349452-18-2DP, sulfonated 364062-39-5DP, sulfonated
366801-18-5DP, sulfonated
RL: IMF (Industrial manufacture); PRP (Properties); TEM
(Technical or engineered material use); PREP (Preparation); USES
(Uses)
(prepn. of curable polyarylenes bearing sulfonic acid for
proton-conductive membranes)

IT 50-79-3, 2,5-Dichlorobenzoic acid 101-84-8, Diphenyl ether
RL: RCT (Reactant); RACT (Reactant or reagent)
(starting material; prepn. of curable polyarylenes bearing sulfonic
acid for proton-conductive membranes)

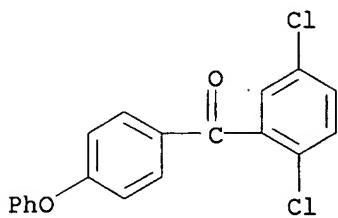
IT 364062-39-5P
RL: IMF (Industrial manufacture); RCT (Reactant); PREP
(Preparation); RACT (Reactant or reagent)
(intermediate; prepn. of curable polyarylenes bearing sulfonic acid for
proton-conductive membranes)

RN 364062-39-5 HCPLUS

CN Methanone, bis(4-chlorophenyl)-, polymer with (2,5-dichlorophenyl)(4-
phenoxyphenyl)methanone (9CI) (CA INDEX NAME)

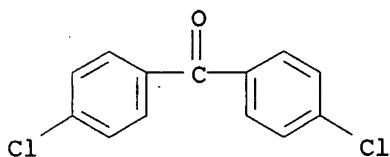
CM 1

CRN 151173-25-0
CMF C19 H12 Cl2 O2



CM 2

CRN 90-98-2
CMF C13 H8 Cl2 O



IT 364062-39-5DP, sulfonated

RL: IMF (Industrial manufacture); PRP (Properties); TEM
(Technical or engineered material use); PREP (Preparation); USES
(Uses)

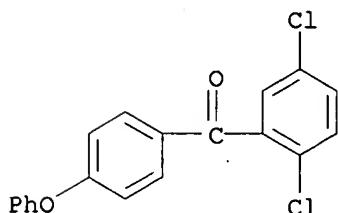
(prepn. of curable polyarylenes bearing sulfonic acid for
proton-conductive membranes)

RN 364062-39-5 HCAPLUS

CN Methanone, bis(4-chlorophenyl)-, polymer with (2,5-dichlorophenyl)(4-
phenoxyphenyl)methanone (9CI) (CA INDEX NAME)

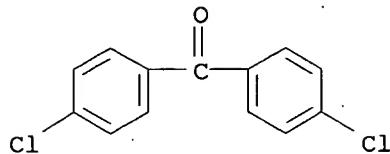
CM 1

CRN 151173-25-0
CMF C19 H12 Cl2 O2



CM 2

CRN 90-98-2
CMF C13 H8 Cl2 O



L16 ANSWER 21 OF 30 HCAPLUS COPYRIGHT 2003 ACS
 AN 2001:713745 HCAPLUS
 DN 135:259851
 TI Ion exchange material for use in **membrane** electrode assembly of
 a **fuel cell**
 IN Andrews, Mark James; Bridges, Richard Frank; Charnock, Peter; Devine, John
 Neil; Kemmish, David John; Lockley, John Edward; Wilson, Brian
 PA Victrex Manufacturing Limited, UK
 SO PCT Int. Appl., 71 pp.
 CODEN: PIXXD2
 DT Patent
 LA English
 IC ICM H01M008-10
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 38
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2001071839	A2	20010927	WO 2001-GB1253	20010321
	WO 2001071839	A3	20020321		
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
	EP 1275164	A2	20030115	EP 2001-917216	20010321
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				
PRAI	GB 2000-6877	A	20000322		
	GB 2000-31207	A	20001221		
	WO 2001-GB1253	W	20010321		
AB	A method of prep. an ion-conducting material, for example membrane , having reduced sensitivity to water includes a step of treating an ion-conducting polymeric material (esp. a sulfonated polyaryletherketone and/or sulfone) which has at least some crystallinity or which is crystallizable with a means to increase its crystallinity. The ion-conducting material prep'd. may be used in a membrane electrode assembly of a fuel cell .				
ST	fuel cell ion exchange membrane ; polymer electrolyte membrane fuel cell				
IT	Solvents (aprotic; ion exchange material for use in membrane electrode assembly of fuel cell)				
IT	Catalysts				

(electrocatalysts; ion exchange material for use in **membrane**
electrode assembly of **fuel cell**)

IT Conducting polymers
Crystallinity
Fuel cells
Membranes, nonbiological
(ion exchange material for use in **membrane** electrode assembly
of **fuel cell**)

IT Polyketones
RL: DEV (Device component use); SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)
(polyether-, sulfonated; ion exchange material for use in
membrane electrode assembly of **fuel cell**)

IT Polyethers, uses
RL: DEV (Device component use); SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)
(polyketone-, sulfonated; ion exchange material for use in
membrane electrode assembly of **fuel cell**)

IT Polymers, uses
RL: DEV (Device component use); USES (Uses)
(sulfonated; ion exchange material for use in **membrane**
electrode assembly of **fuel cell**)

IT 361482-41-9 361482-41-9D, sulfonated
RL: DEV (Device component use); USES (Uses)
(ion exchange material for use in **membrane** electrode assembly
of **fuel cell**)

IT 128324-23-2DP, sulfonated 128324-23-2P 362518-55-6P
362518-56-7DP, sulfonated 362518-56-7P 362518-57-8P
RL: DEV (Device component use); SPN (Synthetic preparation);
PREP (Preparation); USES (Uses)
(ion exchange material for use in **membrane** electrode assembly
of **fuel cell**)

IT 7664-93-9, Sulfuric acid, reactions 31694-16-3, Victrex PEEK 450P
RL: RCT (Reactant); RACT (Reactant or reagent)
(ion exchange material for use in **membrane** electrode assembly
of **fuel cell**)

IT 362518-55-6P 362518-56-7DP, sulfonated
362518-56-7P
RL: DEV (Device component use); SPN (Synthetic preparation);
PREP (Preparation); USES (Uses)
(ion exchange material for use in **membrane** electrode assembly
of **fuel cell**)

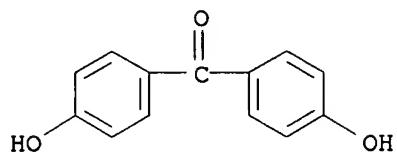
RN 362518-55-6 HCPLUS

CN Methanone, bis(4-fluorophenyl)-, polymer with [1,1'-biphenyl]-4,4'-diol,
bis(4-hydroxyphenyl)methanone and 1,1'-sulfonylbis[4-chlorobenzene] (9CI)
(CA INDEX NAME)

CM 1

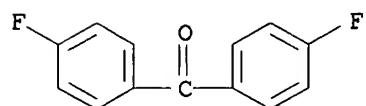
CRN 611-99-4

CMF C13 H10 O3



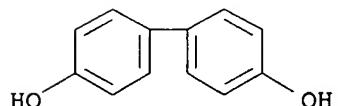
CM 2

CRN 345-92-6
CMF C13 H8 F2 O



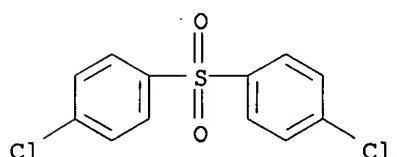
CM 3

CRN 92-88-6
CMF C12 H10 O2



CM 4

CRN 80-07-9
CMF C12 H8 Cl2 O2 S

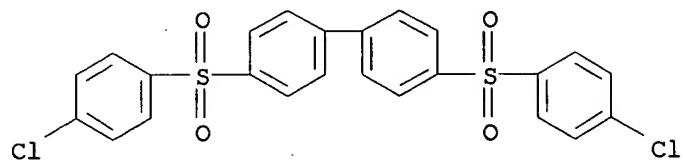


RN 362518-56-7 HCAPLUS
CN Methanone, bis(4-fluorophenyl)-, polymer with [1,1'-biphenyl]-4,4'-diol, 4,4'-bis[(4-chlorophenyl)sulfonyl]-1,1'-biphenyl, bis(4-hydroxyphenyl)methanone and 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

CM 1

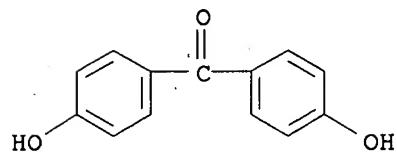
CRN 22287-56-5

CMF C24 H16 Cl2 O4 S2



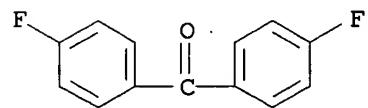
CM 2

CRN 611-99-4
CMF C13 H10 O3



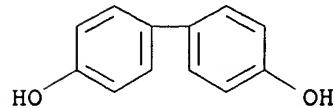
CM 3

CRN 345-92-6
CMF C13 H8 F2 O



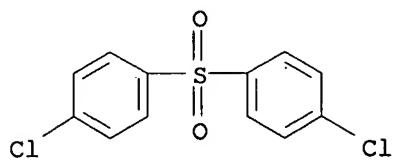
CM 4

CRN 92-88-6
CMF C12 H10 O2



CM 5

CRN 80-07-9
CMF C12 H8 Cl2 O2 S



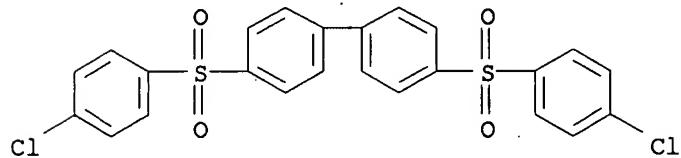
RN 362518-56-7 HCAPLUS

CN Methanone, bis(4-fluorophenyl)-, polymer with [1,1'-biphenyl]-4,4'-diol, 4,4'-bis[(4-chlorophenyl)sulfonyl]-1,1'-biphenyl, bis(4-hydroxyphenyl)methanone and 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

CM 1

CRN 22287-56-5

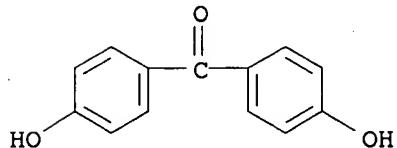
CMF C24 H16 Cl2 O4 S2



CM 2

CRN 611-99-4

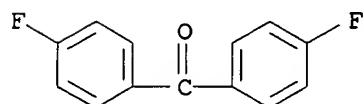
CMF C13 H10 O3



CM 3

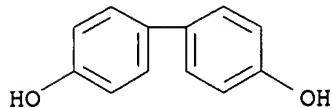
CRN 345-92-6

CMF C13 H8 F2 O



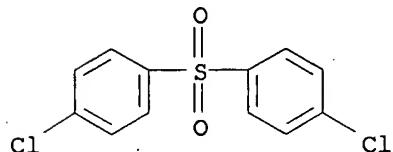
CM 4

CRN 92-88-6
 CMF C12 H10 O2



CM 5

CRN 80-07-9
 CMF C12 H8 Cl2 O2 S



L16 ANSWER 22 OF 30 HCAPLUS COPYRIGHT 2003 ACS
 AN 2001:713457 HCAPLUS
 DN 135:243473
 TI Preparation of ion conducting polymers and composite **electrolyte membrane** therefrom
 IN Charnock, Peter; Wilson, Brian; Bridges, Richard Frank
 PA Victrex Manufacturing Limited, UK
 SO PCT Int. Appl., 63 pp.
 CODEN: PIXXD2
 DT Patent
 LA English
 IC ICM C08J005-22
 CC 38-3 (Plastics Fabrication and Uses)
 Section cross-reference(s): 35, 76
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2001070858	A2	20010927	WO 2001-GB1243	20010321
	WO 2001070858	A3	20011227		
	W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
	RW:	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG			
	EP 1268619	A2	20030102	EP 2001-914017	20010321
	R:	AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR			
PRAI GB 2000-6883	A	20000322			

GB 2000-31209 A 20001221
WO 2001-GB1243 W 20010321

AB A composite material, for example a composite **membrane** for a polymer **electrolyte membrane fuel cell** includes a first conductive polymer and a support material for the polymer, wherein the support material comprises a second conductive polymer. A method making of the composite material is also disclosed as is its use as a polymer **electrolyte membrane** in a **fuel cell**. Thus, a microporous ion conducting **membrane** prep'd. by casting a soln. contg. a 1:1 blend of polyetherketone and a sulfonated copolymer of 4,4'-difluorobenzophenone, 4,4'-dihydroxybenzophenone, and 4,4'-dihydroxybiphenyl was impregnated with a 15% soln. of a sulfonated copolymer of 4,4'-difluorobenzophenone, 4,4'-dihydroxybiphenyl, and 4,4'-dihydroxydiphenylsulfone and the composite **membrane** was strong and flexible.

ST sulfonated polymer ion conducting **membrane** prep'n; **fuel cell membrane** polymer **electrolyte** ion conducting

IT **Membranes**, nonbiological (composite, microporous; prep'n. of ion conducting polymers for composite **electrolyte membrane**)

IT Polyketones
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyether-, arom., sulfonated, reaction products; prep'n. of ion conducting polymers for composite **electrolyte membrane**)

IT Polysulfones, uses
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyether-, sulfonated; prep'n. of ion conducting polymers for composite **electrolyte membrane**)

IT Polyethers, uses
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyketone-, arom., sulfonated, reaction products; prep'n. of ion conducting polymers for composite **electrolyte membrane**)

IT Ionomers
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(polyoxyalkylenes, fluorine- and sulfo-contg.; in prep'n. of ion conducting polymers for composite **electrolyte membrane**)

IT Polyethers, uses
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polysulfone-, sulfonated; prep'n. of ion conducting polymers for composite **electrolyte membrane**)

IT Conducting polymers
Polymer electrolytes
(prep'n. of ion conducting polymers for composite **electrolyte membrane**)

IT Polymer blends
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(prepn. of ion conducting polymers for composite **electrolyte membrane**)

IT Fuel cells
(prepn. of ion conducting polymers for composite **electrolyte membrane** in **fuel cell**)

IT 71957-60-3DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybenzophenone-hydroquinone copolymer, sulfonated **83094-08-0DP**,
4,4'-Dichlorodiphenylsulfone 4,4'-dihydroxybiphenyl 4,4'-dihydroxydiphenylsulfone copolymer, sulfonated 128324-23-2DP,
4,4'-Difluorobenzophenone-4,4'-dihydroxybenzophenone-4,4'-dihydroxybiphenyl copolymer, sulfonated 128324-24-3DP,
4,4'-Difluorobenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenylsulfone copolymer, sulfonated
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(prepn. of ion conducting polymers for composite **electrolyte membrane**)

IT 27380-27-4
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(prepn. of ion conducting polymers for composite **electrolyte membrane**)

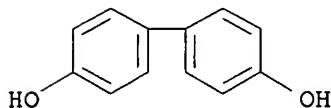
IT **83094-08-0DP**, 4,4'-Dichlorodiphenylsulfone 4,4'-dihydroxybiphenyl 4,4'-dihydroxydiphenylsulfone copolymer, sulfonated
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(prepn. of ion conducting polymers for composite **electrolyte membrane**)

RN 83094-08-0 HCPLUS

CN [1,1'-Biphenyl]-4,4'-diol, polymer with 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

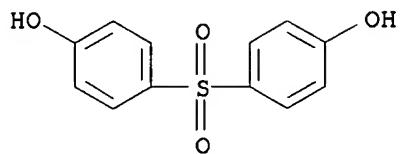
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CRN 92-88-6
CMF C12 H10 O2



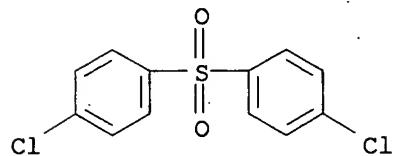
CM 2

CRN 80-09-1
CMF C12 H10 O4 S



CM 3

CRN 80-07-9
CMF C12 H8 Cl2 O2 S



L16 ANSWER 23 OF 30 HCPLUS COPYRIGHT 2003 ACS
AN 2001:585306 HCPLUS
DN 135:360132
TI Heteropolyacid/sulfonated poly(arylene ether sulfone) composites for proton exchange **membranes fuel cells**
AU Kim, Yu Seung; Wang, Feng; Hickner, Michael; Zawodzinski, Tom A.; McGrath, James E.
CS Department of Chemistry and Material Research Institute, Virginia Polytechnic Institute and State University, Blacksburg, VA, 24061, USA
SO Polymeric Materials Science and Engineering (2001), 85, 520-521
CODEN: PMSEDG; ISSN: 0743-0515
PB American Chemical Society
DT Journal
LA English
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 35
AB The prepn. of composite **membranes** for use as proton exchange **membranes** in **fuel cells** at high temps. involves the incorporation of the solid heteropolyacid (hpa), H₃PW₁₂O₄₀, in a poly(arylene ether sulfone) contg. pendant sulfo groups. The poly(arylene ether sulfone) is prepnd. by reacting 4,4'-dichlorodiphenyl sulfone, 3,3'-disodoisulfo-4,4'-dichlorodiphenyl sulfone and 4,4'-biphenol. The HPA extn. behavior, morphol., thermal and mech. properties, and proton conduction at elevated temp. of the composite **membrane** are discussed.
ST heteropolyacid sulfonated polyarylene ether sulfone composite **membrane**; **fuel cell membrane hpa**
sulfonated polyarylene ether sulfone composite
IT **Membranes**, nonbiological
(composite; proton exchange **membranes** from hpa and sulfonated poly(arylene ether sulfone) for **fuel cells**)
IT Polysulfones, uses
RL: SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(polyether-, composites, membranes; proton exchange membranes from hpa and sulfonated poly(arylene ether sulfone) for fuel cells)

IT Polyethers, uses

RL: SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polysulfone-, composites, membranes; proton exchange membranes from hpa and sulfonated poly(arylene ether sulfone) for fuel cells)

IT Fuel cells

(proton exchange membranes from hpa and sulfonated poly(arylene ether sulfone) for fuel cells)

IT 267877-35-0DP, hydrolyzed

RL: SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(composites, membranes; proton exchange membranes from hpa and sulfonated poly(arylene ether sulfone) for fuel cells)

IT 1343-93-7, Phosphotungstic acid (H₃PW₁₂O₄₀)

RL: TEM (Technical or engineered material use); USES (Uses)
(composites, membranes; proton exchange membranes from hpa and sulfonated poly(arylene ether sulfone) for fuel cells)

RE.CNT 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

- (1) Johnson, B; J Polym Sci 1984, V22, P721 HCPLUS
- (2) McGrath, J; ACS Symposium 1999
- (3) Nolte, R; J Memb Sci 1993, P83
- (4) Savadogo, O; J New Mater Electrochem Syst 1998, V1, P66
- (5) Wang, F; Macromot Symp in press 2001
- (6) Wang, F; Polymer Preprints 2000, V41(1), P237 HCPLUS
- (7) Wang, F; Submitted for publication 2001
- (8) Zaidi, S; J Memb Sci 2000, V173, P17 HCPLUS

IT 267877-35-0DP, hydrolyzed

RL: SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(composites, membranes; proton exchange membranes from hpa and sulfonated poly(arylene ether sulfone) for fuel cells)

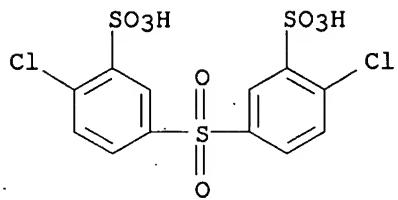
RN 267877-35-0 HCPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with [1,1'-biphenyl]-4,4'-diol and 1,1'-sulfonylbis[4-chlorobenzene] (9CI). (CA INDEX NAME)

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CRN 51698-33-0

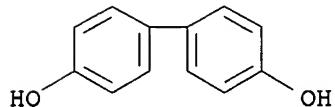
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●2 Na

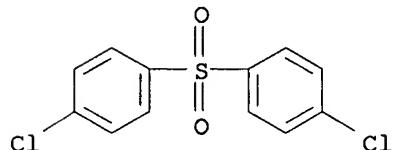
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CRN 92-88-6
CMF C12 H10 O2



CM 3

CRN 80-07-9
CMF C12 H8 Cl2 O2 S



L16 ANSWER 24 OF 30 HCAPLUS COPYRIGHT 2003 ACS
AN 2001:519183 HCAPLUS

DN 135:93703

TI Film-formable polymers bearing sulfonic acid groups, and their proton-conductive films

IN Goto, Kohei; Takahashi, Masayuki; Yamakawa, Yoshitaka; Kakuta, Mayumi; Kawabe, Kenichi; Rojanski, Egori

PA Jsr Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 14 pp.
CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM C08L061-00

ICS G01N027-333; H01B001-06; H01G009-028; H01M006-18; H01M008-02;
H01M010-40

CC 38-3 (Plastics Fabrication and Uses)

Section cross-reference(s): 37

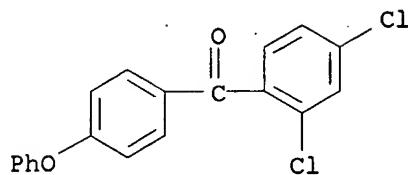
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2001192531	A2	20010717	JP 2000-1062	20000106
PRAI	JP 2000-1062		20000106		
AB	<p>The polymers with high H⁺ cond. at wide temp. region, suitable for battery electrolytes, display devices, sensors, capacitors, ion-exchange membranes, etc., are prep'd. by sulfonating polymers contg. gtoreq. 50 mol% of repeating units C6R1R2R3R4XC6R5R6R7R8 m-C6R9R10R11R12, and/or o-C6R9R10R11R12 (X = CYY'; Y, Y' = H, alkyl, halogenated alkyl, aryl, fluorenylene; R1-8 = H, SO₃H, halo, alkyl, halogenated alkyl, allyl, aryl; R9-12 = H, SO₃H, halo, alkyl, halogenated alkyl, aryl, functional monovalent org. group). Thus, 2, 4-dichloro-4'-phenoxybenzophenone was prep'd. and reacted to give poly(4'-phenoxy-2,4-benzophenone), which was reacted with H₂SO₄ to give a sulfonated polymer showing H⁺ cond. at 20.degree. and 80.degree. 3.1 .times. 10⁻² and 1.5 .times. 10⁻² S/cm², resp., and good swelling resistance in water at 80.degree..</p>				
ST	<p>sulfonated polymer manuf proton conductive film; dichlorophenoxybenzophenone polymer sulfonated proton conductive film; polyphenoxybenzophenone sulfonated proton conductive film</p>				
IT	<p>Ionic conductors Plastic films (polymers bearing sulfonic acid groups for forming proton-conductive films)</p>				
IT	339078-27-2DP, sulfonated	349452-15-9DP, sulfonated			
	349452-16-0DP , sulfonated	349452-17-1DP, sulfonated			
	349452-18-2DP, sulfonated	349464-98-8DP, Poly[(4-phenoxybenzoyl)-1,3-phenylene], sulfonated			
	<p>RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses) (polymers bearing sulfonic acid groups for forming proton-conductive films)</p>				
IT	349452-14-8P				
	<p>RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent) (polymers bearing sulfonic acid groups for forming proton-conductive films)</p>				
IT	349452-16-0DP , sulfonated				
	<p>RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses) (polymers bearing sulfonic acid groups for forming proton-conductive films)</p>				
RN	349452-16-0 HCPLUS				
CN	<p>Methanone, bis(4-chlorophenyl)-, polymer with (2,4-dichlorophenyl)(4-phenoxyphenyl)methanone (9CI) (CA INDEX NAME)</p>				

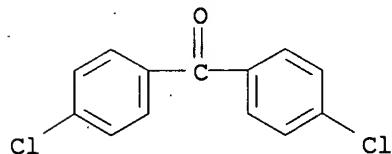
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CMF C19 H12 Cl2 O2



CM 2

CRN 90-98-2
CMF C13 H8 Cl2 O

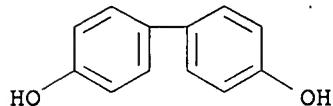
L16 ANSWER 25 OF 30 HCAPLUS COPYRIGHT 2003 ACS
 AN 2001:488751 HCAPLUS
 DN 135:79461
 TI Method of preparation of polymer **electrolyte** for fuel cell
 IN Terahara, Atsushi; Iwasaki, Katsuhiko; Ikeda, Takashi
 PA Sumitomo Chemical Company, Limited, Japan
 SO Eur. Pat. Appl., 13 pp.
 CODEN: EPXXDW
 DT Patent
 LA English
 IC ICM H01M008-10
 ICS H01B001-12; C08F008-36
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 38
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1113517	A2	20010704	EP 2000-128267	20001222
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
	JP 2001250567	A2	20010914	JP 2000-61768	20000307
	US 2001041279	A1	20011115	US 2000-742115	20001222
PRAI	JP 1999-370689	A	19991227		
	JP 2000-61768	A	20000307		
AB	Provided is a polymer electrolyte contg. a block copolymer comprising one or more blocks having sulfonic acid groups and one or more blocks having substantially no sulfonic acid group, and at least one block among all blocks is a block having arom. rings in the main chain thereof, and a method for producing the same. The polymer electrolyte is suitable for a proton conductive film of a fuel cell due to excellent water resistance and heat resistance, and high proton cond.				

ST fuel cell block polymer electrolyte
IT Fuel cell electrolytes
(method of prepn. of polymer electrolyte)
IT Ionic conductivity
(proton; method of prepn. of polymer electrolyte)
IT 347384-10-5DP, sulfonated 347384-11-6DP, sulfonated
347384-12-7DP, sulfonated 347384-13-8DP, sulfonated
347384-14-9DP, sulfonated
RL: DEV (Device component use); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(method of prepn. of polymer electrolyte)
IT 25667-42-9, Sumika ExcelPES5003P
RL: RCT (Reactant); RACT (Reactant or reagent)
(method of prepn. of polymer electrolyte)
IT 347384-10-5DP, sulfonated 347384-11-6DP, sulfonated
347384-12-7DP, sulfonated 347384-13-8DP, sulfonated
347384-14-9DP, sulfonated
RL: DEV (Device component use); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(method of prepn. of polymer electrolyte)
RN 347384-10-5 HCPLUS
CN [1,1'-Biphenyl]-4,4'-diol, polymer with [1,1'-biphenyl]-2-ol and
1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME).

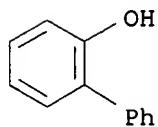
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CMF C12 H10 O2



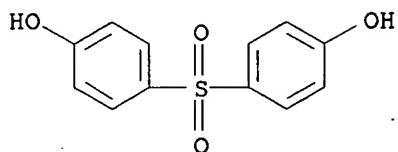
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CRN 90-43-7
CMF C12 H10 O



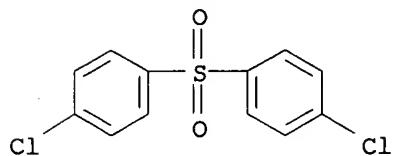
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CRN 80-09-1
CMF C12 H10 O4 S



CM 4

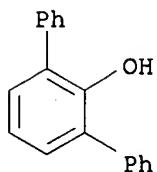
CRN 80-07-9
CMF C12 H8 Cl2 O2 S



RN 347384-11-6 HCPLUS
CN [1,1'-Biphenyl]-4,4'-diol, polymer with 1,1'-sulfonylbis[4-chlorobenzene],
[1,1':3',1'''-terphenyl]-2'-ol and 4,4'-sulfonylbis[phenol] (9CI) (CA
INDEX NAME)

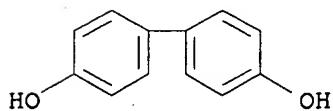
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CRN 2432-11-3
CMF C18 H14 O



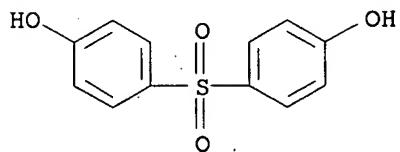
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CRN 92-88-6
CMF C12 H10 O2



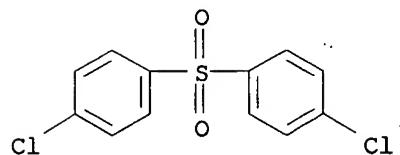
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CRN 80-09-1
CMF C12 H10 O4 S



CM 4

CRN 80-07-9
CMF C12 H8 Cl2 O2 S

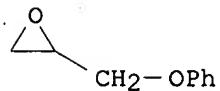


RN 347384-12-7 HCPLUS

CN Phenol, 4,4'-sulfonylbis-, polymer with (chloromethyl)oxirane,
(phenoxyethyl)oxirane and 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA
INDEX NAME)

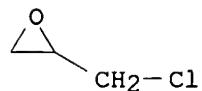
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CRN 122-60-1
CMF C9 H10 O2



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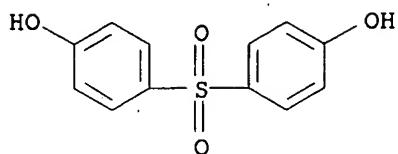
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CMF C3 H5 Cl O



CM 3

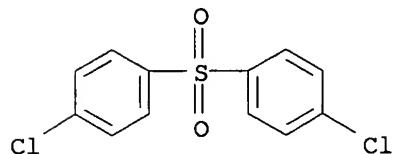
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CMF C12 H10 O4 S



CM 4

CRN 80-07-9
CMF C12 H8 Cl2 O2 S

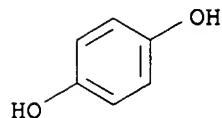


RN 347384-13-8 HCAPLUS

CN 1,4-Benzenediol, polymer with (chloromethyl)oxirane, 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

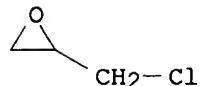
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CRN 123-31-9
CMF C6 H6 O2



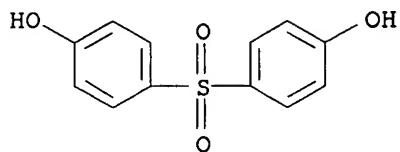
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CRN 106-89-8
CMF C3 H5 Cl O



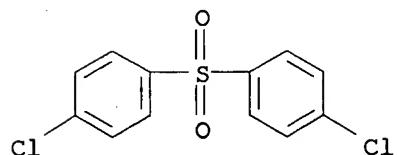
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CRN 80-09-1
CMF C12 H10 O4 S



CM 4

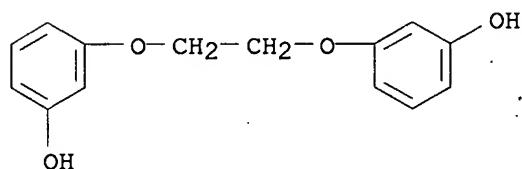
CRN 80-07-9
CMF C12 H8 Cl2 O2 S



RN 347384-14-9 HCPLUS
CN Phenol, 3,3'-(1,2-ethanediylbis(oxy))bis-, polymer with (chloromethyl)oxirane, 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

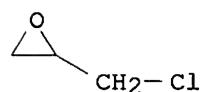
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CRN 61166-00-5
CMF C14 H14 O4



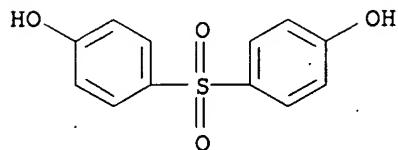
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



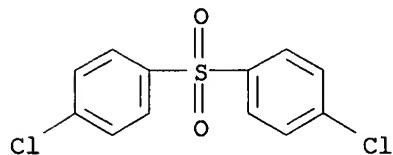
CM 3

CRN 80-09-1
CMF C12 H10 O4 S



CM 4

CRN 80-07-9
CMF C12 H8 Cl2 O2 S



L16 ANSWER 26 OF 30 HCPLUS COPYRIGHT 2003 ACS
AN 2001:421255 HCPLUS
DN 135:35193
TI Solid polymer **electrolyte fuel cells** and
their operation
IN Terada, Ichiro
PA Asahi Glass Co., Ltd., Japan
SO Jpn. Kokai Tokyo Koho, 6 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H01M008-10
 ICS H01M008-02; H01M008-04
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 2001160408	A2	20010612	JP 1999-342321	19991201
PRAI JP 1999-342321		19991201		

AB The fuel gas and/or the oxidn. gas is fed to the electrodes after their contact with ion exchangers. Operation of the cells including the above stated process is also claimed.
ST solid polymer **electrolyte fuel cell**
operation; gas ion exchange treatment **fuel cell**; oxidn
gas ion exchange treatment **fuel cell**; polysulfone
polythioether ion exchanger **fuel cell**
IT Polyolefin fibers
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(ethylene, ion exchanger support; operation of solid polymer

electrolyte fuel cells by treatment of fuel
gas and/or oxidn. gas through ion exchangers before their feeding to
electrodes)

IT Polyolefin fibers
Synthetic polymeric fibers, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical
process); PNU (Preparation, unclassified); PREP (Preparation); PROC
(Process); USES (Uses)
(ethylene-styrene, graft, chlorosulfonated, chloromethylated, and ,
quaternized, anion exchange filter; operation of solid polymer
electrolyte fuel cells by treatment of fuel
gas and/or oxidn. gas through ion exchangers before their feeding to
electrodes)

IT Alkenes, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical
process); PROC (Process); USES (Uses)
(fluoro, ion exchanger layer formed on; operation of solid polymer
electrolyte fuel cells by treatment of fuel
gas and/or oxidn. gas through ion exchangers before their feeding to
electrodes)

IT Polyolefins
RL: DEV (Device component use); PEP (Physical, engineering or chemical
process); PROC (Process); USES (Uses)
(ion exchanger layer formed on; operation of solid polymer
electrolyte fuel cells by treatment of fuel
gas and/or oxidn. gas through ion exchangers before their feeding to
electrodes)

IT Anion exchangers
Cation exchangers
Ion exchange
Solid state fuel cells
(operation of solid polymer electrolyte fuel
cells by treatment of fuel gas and/or oxidn. gas through ion
exchangers before their feeding to electrodes)

IT Polythioethers
RL: DEV (Device component use); PEP (Physical, engineering or chemical
process); PNU (Preparation, unclassified); PREP (Preparation); PROC
(Process); USES (Uses)
(polysulfone-, chloromethylated and aminated, anion exchange filters;
operation of solid polymer electrolyte fuel
cells by treatment of fuel gas and/or oxidn. gas through ion
exchangers before their feeding to electrodes)

IT Polysulfones, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical
process); PNU (Preparation, unclassified); PREP (Preparation); PROC
(Process); USES (Uses)
(polythioether-, chloromethylated and aminated, anion exchange filters;
operation of solid polymer electrolyte fuel
cells by treatment of fuel gas and/or oxidn. gas through ion
exchangers before their feeding to electrodes)

IT 75-50-3DP, Trimethylamine, reaction products with chloromethylated
polymers 25608-64-4DP, chloromethylated, reaction products with
trimethylamine
RL: DEV (Device component use); PEP (Physical, engineering or chemical
process); PNU (Preparation, unclassified); PREP (Preparation);
PROC (Process); USES (Uses)
(anion exchange filter; operation of solid polymer electrolyte
fuel cells by treatment of fuel gas and/or oxidn. gas

through ion exchangers before their feeding to electrodes)

IT 26654-97-7P
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PNU (Preparation, unclassified); PREP (Preparation); PROC (Process); USES (Uses)
(cation exchange filter; operation of solid polymer **electrolyte fuel cells** by treatment of fuel gas and/or oxidn. gas through ion exchangers before their feeding to electrodes)

IT 106826-12-4DP, Ethylene-styrene graft copolymer, chlorosulfonated, chloromethylated, reaction products with trimethylamine, quaternized
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PNU (Preparation, unclassified); PREP (Preparation); PROC (Process); USES (Uses)
(fiber, anion exchange filter; operation of solid polymer **electrolyte fuel cells** by treatment of fuel gas and/or oxidn. gas through ion exchangers before their feeding to electrodes)

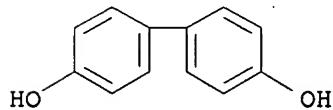
IT 9002-88-4, Polyethylene
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(ion exchanger support; operation of solid polymer **electrolyte fuel cells** by treatment of fuel gas and/or oxidn. gas through ion exchangers before their feeding to electrodes)

IT 25608-64-4DP, chloromethylated, reaction products with trimethylamine
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PNU (Preparation, unclassified); PREP (Preparation); PROC (Process); USES (Uses)
(anion exchange filter; operation of solid polymer **electrolyte fuel cells** by treatment of fuel gas and/or oxidn. gas through ion exchangers before their feeding to electrodes)

RN 25608-64-4 HCAPLUS
CN [1,1'-Biphenyl]-4,4'-diol, polymer with 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

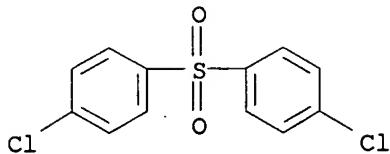
CM 1

CRN 92-88-6
CMF C12 H10 O2



CM 2

CRN 80-07-9
CMF C12 H8 Cl2 O2 S



L16 ANSWER 27 OF 30 HCAPLUS COPYRIGHT 2003 ACS
 AN 2001:212602 HCAPLUS
 DN 134:367313
 TI Copolymerization of arylchlorides by nickel catalyzed coupling: novel polyelectrolytes
 AU Poppe, D.; Frey, H.; Heinzel, A.; Mulhaupt, R.
 CS Institut fur Makromolekulare Chemie and Freiburger Materialforschungszentrum (FMF), Freiburg, D-79104, Germany
 SO Polymeric Materials Science and Engineering (2001), 84, 333-334
 CODEN: PMSEDG; ISSN: 0743-0515
 PB American Chemical Society
 DT Journal
 LA English
 CC 35-5 (Chemistry of Synthetic High Polymers)
 AB The objective of this work was the synthesis of poly(arylenesulfone) copolymers with carboxylic acid functionalities. Copolymer. of Me 2,5-dichlorobenzoate (MDCB) and 4,4'-dichlorodiphenylsulfone (DCDS) by nickel-catalyzed coupling reaction was studied. Polymers with different DCDS/MCDB incorporation ratios were obtained. The materials were sol. in chloroform. Mol. wts. detd. by SEC varied between Mw = 7,000 g/mol and 36,500 g/mol. Casting of the copolymer with the highest mol. wt. from chloroform afforded flexible and transparent films. Hydrolysis of the polymers led to a flexible polyelectrolyte which was sol. in water in the form of its deprotonated species. The water insol. protonated polymer was swollen without losing its mech. integrity. TGA showed good thermal stability. In future work we will study the suitability of these carboxylic acid functionalized poly(arylenesulfone)s as blend component for fuel cell membranes.
 ST thermally stable polyelectrolyte dichlorobenzoate dichlorodiphenylsulfone copolymer prep; polyarylene sulfone prep thermally stable polyelectrolyte
 IT Polyelectrolytes
 (anionic; copolymer. of arylchlorides by nickel catalyzed coupling giving thermally stable polyelectrolytes)
 IT Polysulfones, preparation
 RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
 (arom.; copolymer. of arylchlorides by nickel catalyzed coupling giving thermally stable polyelectrolytes)
 IT Thermal stability
 (copolymer. of arylchlorides by nickel catalyzed coupling giving thermally stable polyelectrolytes)
 IT 340127-60-8DP, Methyl 2,5-dichlorobenzoate-4,4'-dichlorodiphenyl sulfone copolymer, hydrolyzed
 RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
 (copolymer. of arylchlorides by nickel catalyzed coupling giving thermally stable polyelectrolytes)
 RE.CNT 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

- (1) Chaturvedi, V; Macromolecules 1993, V26, P2607 HCPLUS
- (2) Colon, I; J Org Chem 1986, V51, P2627 HCPLUS
- (3) Colon, I; J Polym Sci, Part A: Polym Chem 1990, V28, P367 HCPLUS
- (4) Ghassemi, H; Polymer 1997, V38, P3139 HCPLUS
- (5) Grob, M; Macromolecules 1996, V29, P7284 HCPLUS
- (6) Havelka-Rivard, P; Macromolecules 1999, V32, P6418 HCPLUS
- (7) Kaeriyama, K; Synth Met 1995, V69, P507 HCPLUS
- (8) Kwiatkowski, G; J Macromol Sci, Pure Appl Chem 1997, VA34, P1945 HCPLUS
- (9) Percec, V; Macromolecules 1992, V25, P1816 HCPLUS
- (10) Percec, V; Macromolecules 1999, V32, P2597 HCPLUS
- (11) Phillips, R; Macromolecules 1994, V27, P2354 HCPLUS
- (12) Ueda, M; Macromol Rapid Commun 1995, V16, P469 HCPLUS
- (13) Ueda, M; Macromolecules 1990, V23, P926 HCPLUS

IT 340127-60-8DP, Methyl 2,5-dichlorobenzoate-4,4'-dichlorodiphenyl sulfone copolymer, hydrolyzed

RL: PRP (Properties); SPN (Synthetic preparation); PREP

(Preparation)

(copolymn. of arylchlorides by nickel catalyzed coupling giving thermally stable polyelectrolytes)

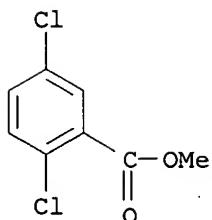
RN 340127-60-8 HCPLUS

CN Benzoic acid, 2,5-dichloro-, methyl ester, polymer with 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

CM 1

CRN 2905-69-3

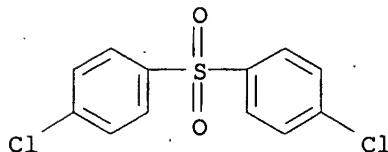
CMF C8 H6 Cl2 O2



CM 2

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



L16 ANSWER 28 OF 30 HCPLUS COPYRIGHT 2003 ACS
AN 2000:594001 HCPLUS

KATHLEEN FULLER EIC 1700/PARKER LAW 308-4290

DN 133:296766
TI Synthesis and characterization of controlled molecular weight sulfonated amino-functional poly(arylene ether sulfone)s prepared by direct polymerization
AU Mecham, J.; Shobha, H. K.; Wang, F.; Harrison, W.; McGrath, J. E.
CS Department of Chemistry and Center for High Performance Polymeric Adhesives and Composites (0344), Virginia Polytechnic Institute and State University, Blacksburg, VA, 24061, USA
SO Polymer Preprints (American Chemical Society, Division of Polymer Chemistry) (2000), 41(2), 1388-1389
CODEN: ACPPAY; ISSN: 0032-3934
PB American Chemical Society, Division of Polymer Chemistry
DT Journal
LA English
CC 35-5 (Chemistry of Synthetic High Polymers)
AB Controlled mol. wt. sulfonated poly(arylene ether sulfone)s were prep'd. by direct polymn. of the sulfonated dihalide using typical polysulfone polymn. conditions. Reaction temps. of 190.degree. were needed to ensure the polymer remained in soln. throughout the reaction. The 4,4'-dichlorodiphenylsulfone (DCDPS) with fuming sulfuric acid (SO₃ 28%), isolated with NaCl, neutralized with NaOH, and finally isolated with NaCl. The electrophilic arom. substitution reaction sulfonates DCDPS meta to the sulfonyl group and ortho to the chlorine group. Polymn. involved condensation of m-aminophenol with SDCDPS and biphenol in NMP, with toluene as an azeotroping agent. These materials can be used as macromonomers in poly(imide) segmented copolymer reactions and as proton exchange membranes for fuel cells.
ST dichlorodiphenylsulfone sulfonation fuming sulfuric acid direct polymn; polyaryleneether polysulfone prep'n controlled mol wt
IT Polysulfones, preparation
Polysulfones, preparation
RL: SPN (Synthetic preparation); PREP (Preparation)
(polyoxyarylene-, arom., sulfonated; prep'n. of sulfonated dichlorodiphenylsulfone and of controlled mol. wt. amino-terminated sulfonated poly(arylene ether sulfone)s)
IT Polyoxyarylenes
Polyoxyarylenes
RL: SPN (Synthetic preparation); PREP (Preparation)
(polysulfone-, arom., sulfonated; prep'n. of sulfonated dichlorodiphenylsulfone and of controlled mol. wt. amino-terminated sulfonated poly(arylene ether sulfone)s)
IT Polymerization
Sulfonylation
(prep'n. of sulfonated dichlorodiphenylsulfone and of controlled mol. wt. amino-terminated sulfonated poly(arylene ether sulfone)s)
IT 51698-33-0P
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
(monomer; prep'n. of sulfonated dichlorodiphenylsulfone and of controlled mol. wt. amino-terminated sulfonated poly(arylene ether sulfone)s)
IT 80-07-9, 4,4'-Dichlorodiphenylsulfone 7446-11-9, Sulfur trioxide, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(prep'n. of sulfonated dichlorodiphenylsulfone and of controlled mol. wt. amino-terminated sulfonated poly(arylene ether sulfone)s)
IT 591-27-5DP, m-Aminophenol, reaction products with sulfo group-contg. polyether-polysulfones 267877-35-0DP, m-aminophenol end-capped

RL: SPN (Synthetic preparation); PREP (Preparation)

(prepn. of sulfonated dichlorodiphenylsulfone and of controlled mol.
wt. amino-terminated sulfonated poly(arylene ether sulfone)s)

RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

- (1) Applby, A; Sci American 1999, P72
- (2) Dumais, J; Macromolecules 1986, V19, P1884 HCPLUS
- (3) Jacoby, M; C&E News 1999, V31, P71
- (4) McGrath, J; J of Polym Sci 1984, V22, P721
- (5) McGrath, J; Poly(aryl ether) Membranes for Reverse Osmosis 1981, V153, P327
- (6) McGrath, J; Polymer Preprints 2000, V41(1)
- (7) Noshay, A; J of Appl Poly Sci 1976, V20, P1885 HCPLUS
- (8) Robeson, L; Dynamic Mechanical Characteristics of Polysulfones and Other Polyarylethers, in Molecular Basis for Transitions and Relaxations 1978, V4, P405 HCPLUS
- (9) Ueda, M; J Polym Sci, Poly Chem Ed 1993, V31, P85

IT 267877-35-0DP, m-aminophenol end-capped

RL: SPN (Synthetic preparation); PREP (Preparation)

(prepn. of sulfonated dichlorodiphenylsulfone and of controlled mol.
wt. amino-terminated sulfonated poly(arylene ether sulfone)s)

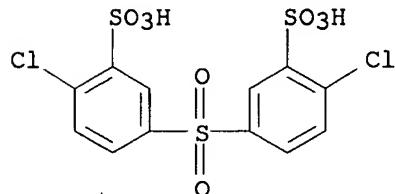
RN 267877-35-0 HCPLUS

CN Benzenesulfonic acid; 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer
with [1,1'-biphenyl]-4,4'-diol and 1,1'-sulfonylbis[4-chlorobenzene] (9CI)
(CA INDEX NAME)

CM 1

CRN 51698-33-0

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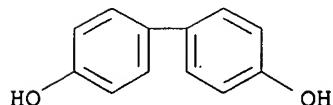


●2 Na

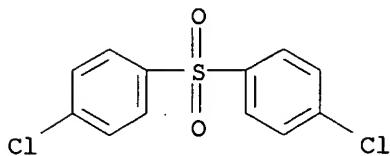
CM 2

CRN 92-88-6

CMF C12 H10 O2



CM 3

CRN 80-07-9
CMF C12 H8 Cl2 O2 S

L16 ANSWER 29 OF 30 HCPLUS COPYRIGHT 2003 ACS
 AN 2000:191136 HCPLUS
 DN 132:237553
 TI Polyoxyphenylene ion-exchange polymers
 IN Charnock, Peter; Kemmish, David John; Staniland, Philip Anthony; Wilson, Brian
 PA Victrex Manufacturing Ltd., UK
 SO PCT Int. Appl., 64 pp.
 CODEN: PIXXD2
 DT Patent
 LA English
 IC ICM C08G065-48
 ICS C08J005-22; H01M006-18; H01M010-40; H01M008-10; H01M002-16
 CC 35-5 (Chemistry of Synthetic High Polymers)
 FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 20000015691	A1	20000323	WO 1999-GB2833	19990910
	W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG	
	CA 2343184	AA	20000323	CA 1999-2343184	19990910
	AU 9957509	A1	20000403	AU 1999-57509	19990910
	EP 1112301	A1	20010704	EP 1999-944684	19990910
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
	JP 2002524631	T2	20020806	JP 2000-570225	19990910
	WO 2001019896	A1	20010322	WO 2000-GB3449	20000908
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG	

EP 1228122 A1 20020807 EP 2000-958834 20000908
 R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
 IE, SI, LT, LV; FI, RO, MK, CY, AL
 JP 2003509554 T2 20030311 JP 2001-523671 20000908
 PRAI GB 1998-19706 A 19980911
 GB 1998-20940 A 19980928
 GB 1999-13572 A 19990611
 WO 1999-GB2833 W 19990910
 GB 2000-6884 A 20000322
 WO 2000-GB3449 W 20000908

AB Ion-Exchange polymers for a polymer electrolyte membrane include the repeating units EAr(C₆H₄)_mE' (I), C₆H₄CO(C₆H₄)_wG[(C₆H₄)_rCOC₆H₄]_s (II), and/or C₆H₄SO₂(C₆H₄)_zG[(C₆H₄)_tSO₂C₆H₄]_v (III) wherein at least some of the units I, II and/or III are sulfonated; wherein the Ph moieties in units I, II, and III are independently optionally substituted and optionally cross-linked; and wherein m, r, s, t, v, w and z independently represent zero or a pos. integer, E and E' independently represent an oxygen or a sulfur atom or a direct link, G represents an oxygen or sulfur atom, a direct link or a -O-Ph-O- moiety where Ph represents a Ph group and Ar is selected from one of the above moieties (i) to (x) which is bonded via one or more of its Ph moieties to adjacent moieties.

ST sulfonated polyoxyphenylene ion exchange electrolyte membrane

IT Membranes, nonbiological (electrolyte; polyoxyphenylene ion-exchange polymers)

IT Electrodes (gas-diffusion; polyoxyphenylene ion-exchange polymers)

IT Electrolytes (membrane; polyoxyphenylene ion-exchange polymers)

IT Polyoxyphenylenes
 Polyoxyphenylenes
 Polyoxyphenylenes
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (polyketone-, cardo; polyoxyphenylene ion-exchange polymers)

IT Polyoxyphenylenes
 Polyoxyphenylenes
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (polyketone-; polyoxyphenylene ion-exchange polymers)

IT Polysulfones, preparation
 Polysulfones, preparation
 Polysulfones, preparation
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (polyketone-polyoxyphenylene-; polyoxyphenylene ion-exchange polymers)

IT Cardo polymers
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (polyketone-polyoxyphenylenes; polyoxyphenylene ion-exchange polymers)

IT Polyoxyphenylenes
 Polyoxyphenylenes
 Polyoxyphenylenes
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (polyketone-polysulfone-; polyoxyphenylene ion-exchange polymers)

IT Fuel cells

(polyoxyphenylene ion-exchange polymers)

IT Polyketones
Polyketones
Polyketones
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyoxyphenylene-, cardo; polyoxyphenylene ion-exchange polymers)

IT Polyketones
Polyketones
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyoxyphenylene-; polyoxyphenylene ion-exchange polymers)

IT Polyketones
Polyketones
Polyketones
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyoxyphenylene-polysulfone-; polyoxyphenylene ion-exchange polymers)

IT 25718-32-5DP, sulfonated 83094-08-0DP, sulfonated
88033-16-3DP, sulfonated 104570-14-1DP, sulfonated 105777-36-4DP,
sulfonated 116875-10-6P 125430-17-3DP, sulfonated 125431-57-4DP,
sulfonated 128324-23-2DP, 4,4'-Difluorobenzophenone-4,4'-
dihydroxybenzophenone-4,4'-dihydroxybiphenyl copolymer, sulfonated
128324-24-3DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybiphenyl-4,4'-
dihydroxydiphenylsulfone copolymer, sulfonated 139357-70-3DP, sulfonated
261638-66-8P 261638-67-9DP, sulfonated
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyoxyphenylene ion-exchange polymers)

RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Commissariat Energie Atomique; FR 2748485 A 1997 HCPLUS
(2) Hoechst Ag; EP 0574791 A 1993 HCPLUS
(3) Ici Plc; EP 0008895 A 1980 HCPLUS
(4) Ici Plc; EP 0382440 A 1990 HCPLUS
(5) Joachim, C; WO 9629360 A 1996 HCPLUS
(6) Sumitomo Chemical Co; EP 0932213 A 1999 HCPLUS
(7) Union Carbide Corp; EP 0211693 A 1987 HCPLUS

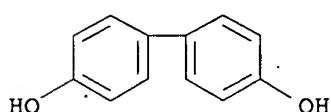
IT 83094-08-0DP, sulfonated
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyoxyphenylene ion-exchange polymers)

RN 83094-08-0 HCPLUS

CN [1,1'-Biphenyl]-4,4'-diol, polymer with 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

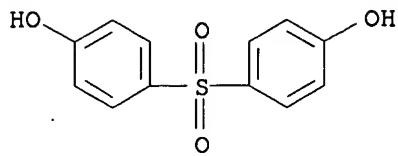
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CRN 92-88-6
CMF C12 H10 O2



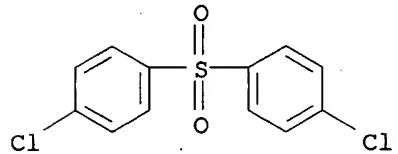
CM 2

CRN 80-09-1
CMF C12 H10 O4 S



CM 3

CRN 80-07-9
CMF C12 H8 Cl2 O2 S



L16 ANSWER 30 OF 30 HCAPLUS COPYRIGHT 2003 ACS
AN 1998:70920 HCAPLUS
DN 128:143140
TI Polymer electrolytes for fuel cells and the
fuel cells
IN Iwasaki, Katsuhiko; Yamamoto, Taketsugu; Harada, Hiroshi; Terahara,
Atsushi; Sato, Kunihisa
PA Sumitomo Chemical Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 7 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H01M008-02
 ICS C08G075-20; H01M008-10
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 10021943	A2	19980123	JP 1996-169932	19960628
	US 5985477	A	19991116	US 1997-997564	19971223
PRAI	JP 1996-169932		19960628		
GI					

* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT *

AB The **electrolytes** are sulfonated copolymers of I and II ($\text{Ar} = \text{III, IV, V, VI, VII, VIII, or IX}$, $m = 1-3$, $n = 1$ or 2) having ion exchanging group equiv. wt. 500-2500 g/mol. The **electrolytes** are preferably in the form of a **membrane** prep'd. by soln. casting, melt pressing, or extrusion molding.

ST fuel cell arom sulfone sulfonate **electrolyte**

IT Fuel cell **electrolytes**

(compns. and manuf. of ion exchanger polymer **electrolytes** for fuel cells)

IT 83094-08-0DP, sulfonated

RL: DEV (Device component use); IMF (Industrial manufacture); PRP (Properties); PREP (Preparation); USES (Uses)
(compns. and manuf. of ion exchanger polymer **electrolytes** for fuel cells)

IT 83094-08-0DP, sulfonated

RL: DEV (Device component use); IMF (Industrial manufacture); PRP (Properties); PREP (Preparation); USES (Uses)
(compns. and manuf. of ion exchanger polymer **electrolytes** for fuel cells)

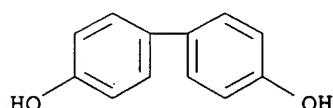
RN 83094-08-0 HCAPLUS

CN [1,1'-Biphenyl]-4,4'-diol, polymer with 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

CM 1

CRN 92-88-6

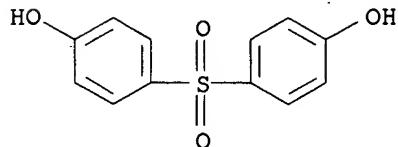
CMF C12 H10 O2



CM 2

CRN 80-09-1

CMF C12 H10 O4 S



CM 3

CRN 80-07-9

CMF C12 H8 Cl2 O2 S

